FIG. 1

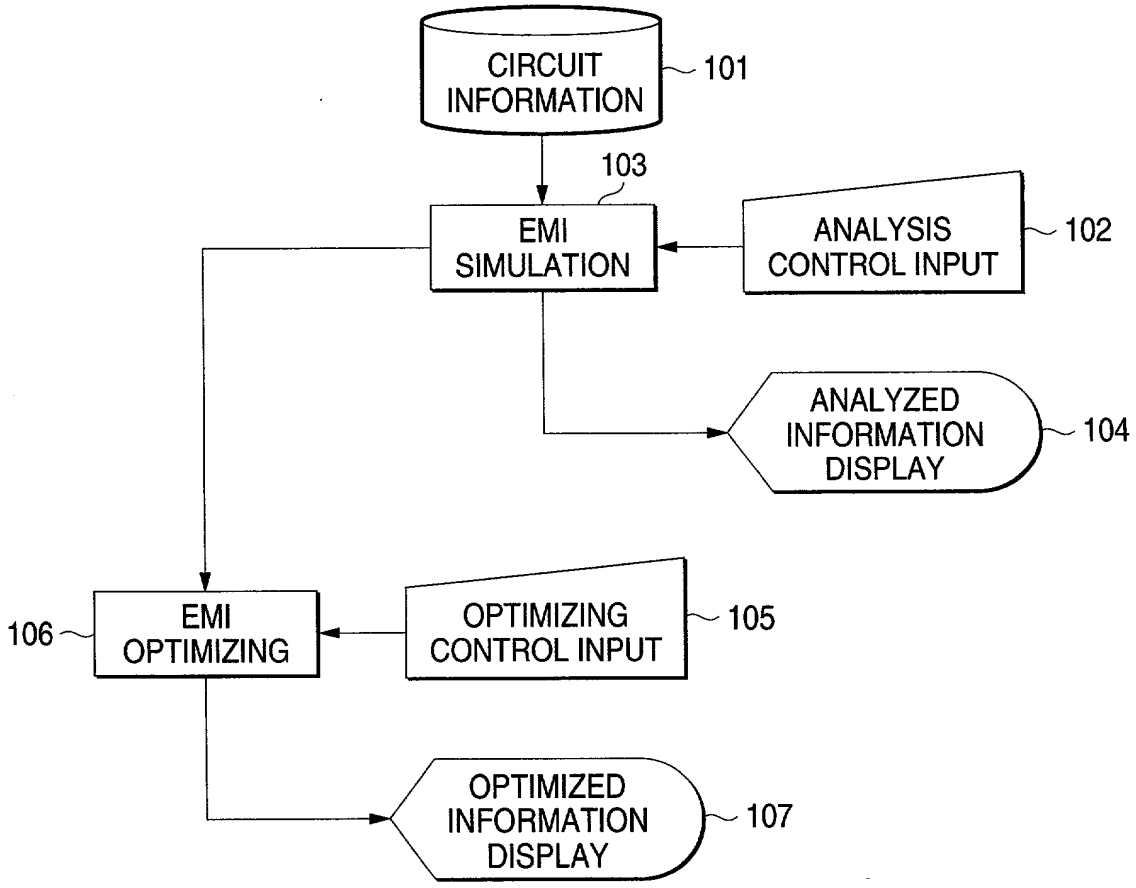

CIRCUIT INFORMATION
101
103
EMI SIMULATION
ANALYSIS CONTROL INPUT
102
ANALYZED INFORMATION DISPLAY
104
106
EMI OPTIMIZING
OPTIMIZING CONTROL INPUT
105
OPTIMIZED INFORMATION DISPLAY
107

FIG. 2

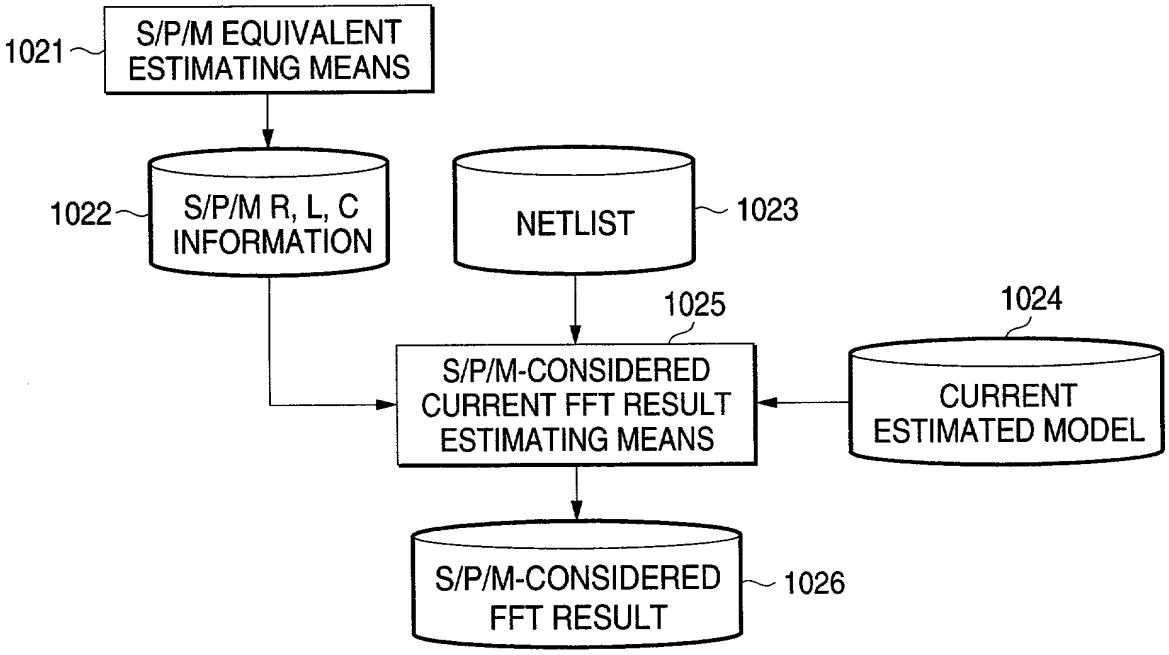

1021
S/P/M EQUIVALENT ESTIMATING MEANS
1022
S/P/M R, L, C INFORMATION
NETLIST
1023
1025
1024
S/P/M-CONSIDERED CURRENT FFT RESULT ESTIMATING MEANS
CURRENT ESTIMATED MODEL
S/P/M-CONSIDERED FFT RESULT
1026

FIG. 3

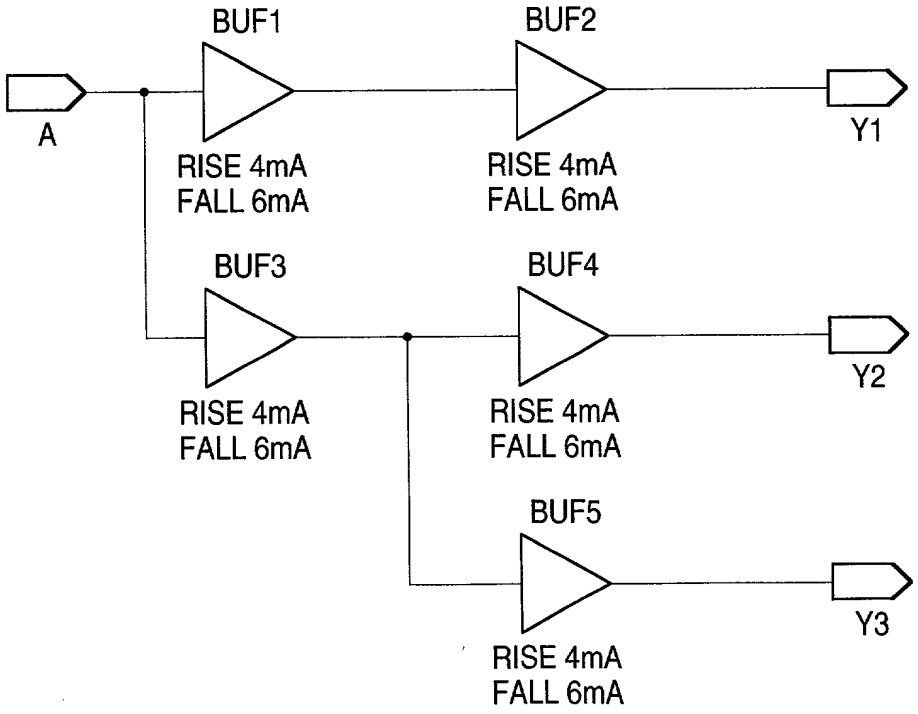

BUF1
BUF2
A
Y1
RISE 4mA
FALL 6mA
RISE 4mA
FALL 6mA
BUF3
BUF4
Y2
RISE 4mA
FALL 6mA
RISE 4mA
FALL 6mA
BUF5
Y3
RISE 4mA
FALL 6mA

FIG. 4

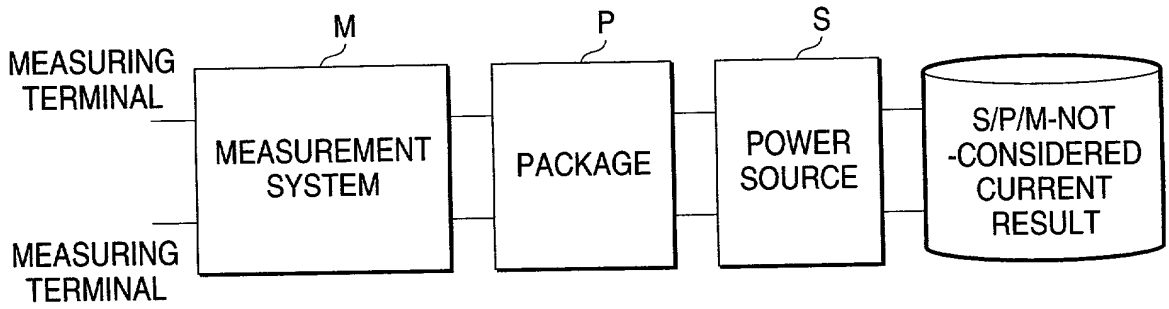

M
P
S
MEASURING TERMINAL
MEASURING TERMINAL
MEASUREMENT SYSTEM
PACKAGE
POWER SOURCE
S/P/M-NOT -CONSIDERED CURRENT RESULT

FIG. 5

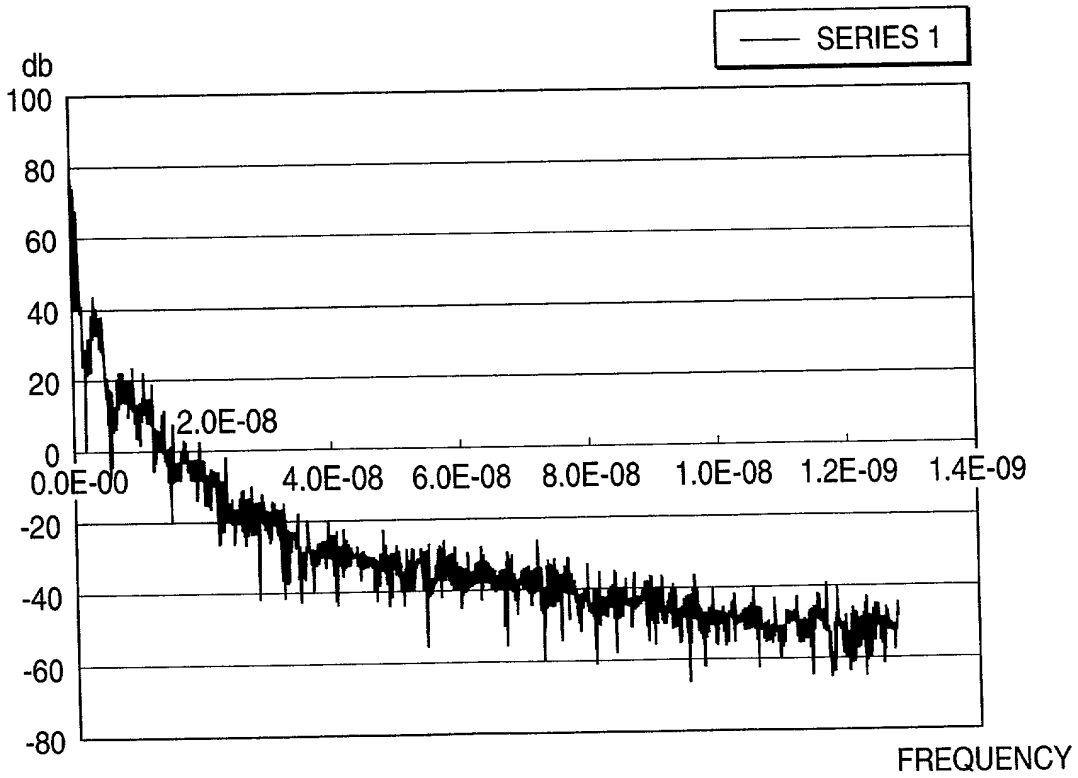

SERIES 1
db
100
80
60
40
20
0
-20
-40
-60
-80
2.0E-08
0.0E-00
4.0E-08
6.0E-08
8.0E-08
1.0E-08
1.2E-09
1.4E-09
FREQUENCY

FIG. 6 (a)

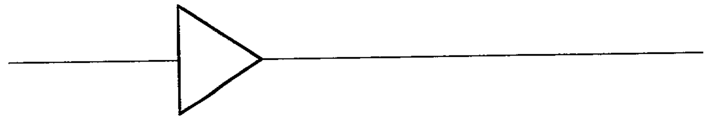


FIG. 6 (b)

LOGICAL CHANGE

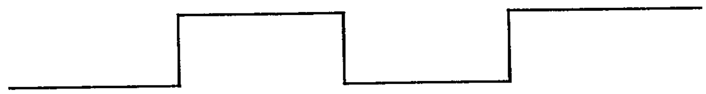


FIG. 6 (c)

ESTIMATED POWER SOURCE CURRENT AT SMALL DECOUPLING CAPACITANCE

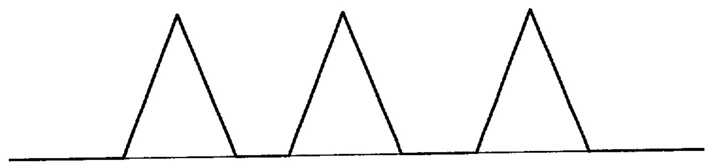


FIG. 6 (d)

ESTIMATED POWER SOURCE CURRENT AT LARGE DECOUPLING CAPACITANCE

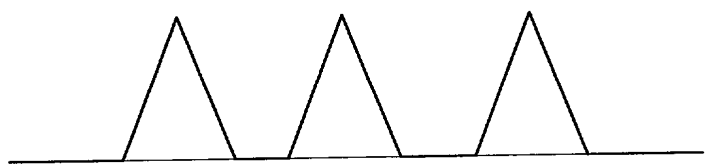


FIG. 7 (a)

FIG. 7 (b)

LOGICAL CHANGE

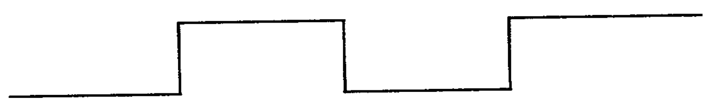


FIG. 7 (c)

ESTIMATED POWER SOURCE CURRENT AT SMALL DECOUPLING CAPACITANCE

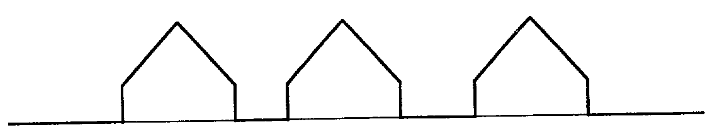


FIG. 7 (d)

ESTIMATED POWER SOURCE CURRENT AT LARGE DECOUPLING CAPACITANCE

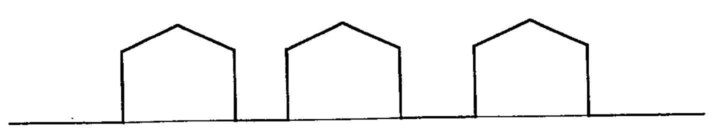


FIG. 8

TIMING [ns]	POWER SOURCE CURRENT VALUE [mA]
0	0
95	20
100	50
105	20
195	30
200	70
205	30
295	20
300	50
305	20
395	30
400	70
405	30
495	20
500	30
505	20

801 802

FIG. 9

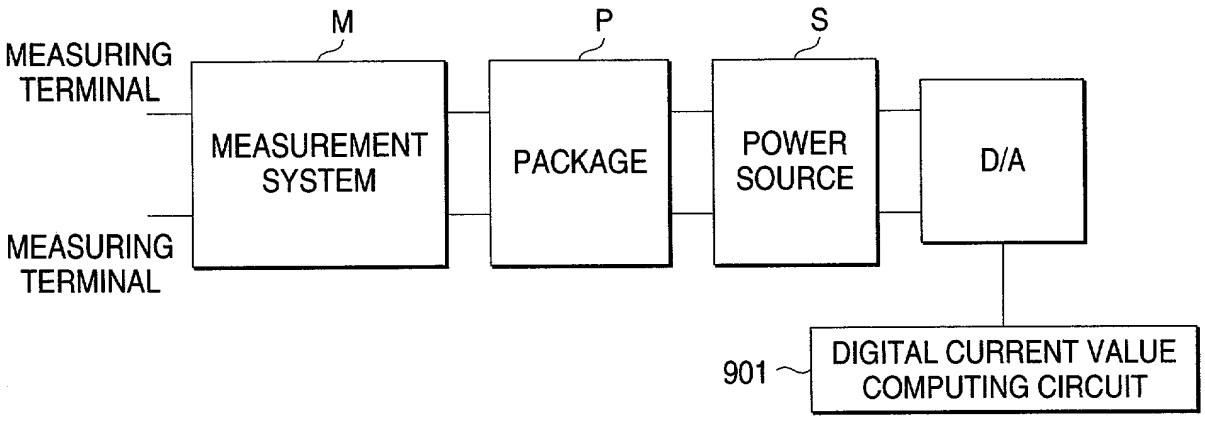

M
P
S
MEASURING TERMINAL
MEASURING TERMINAL
MEASUREMENT SYSTEM
PACKAGE
POWER SOURCE
D/A
901
DIGITAL CURRENT VALUE COMPUTING CIRCUIT

FIG. 10

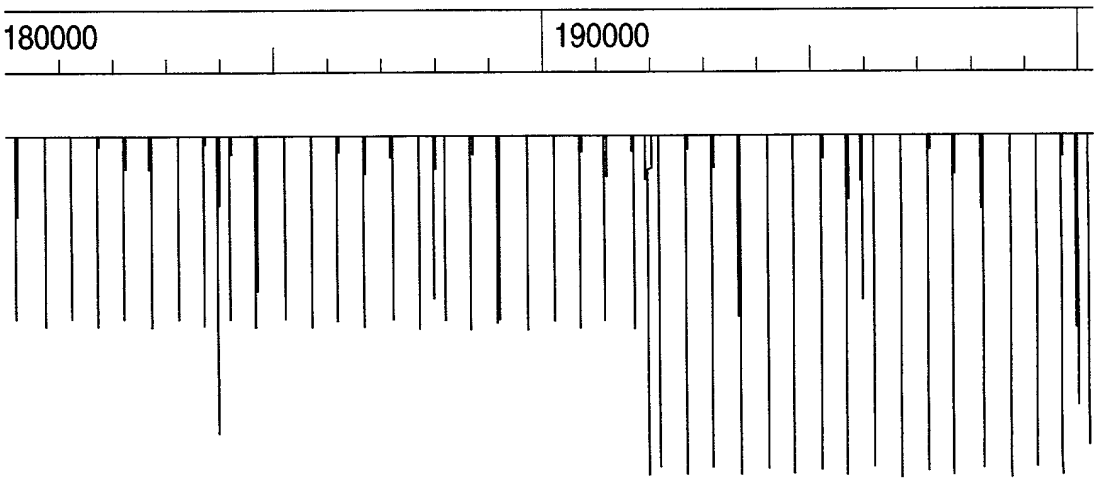

180000
190000

FIG. 11

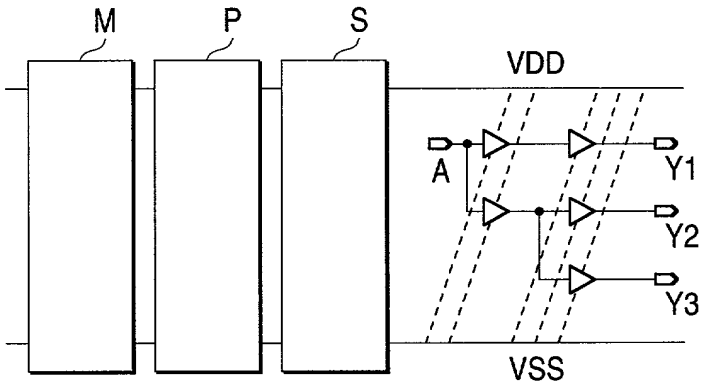

M
P
S
VDD
A
Y1
Y2
Y3
VSS

FIG. 12

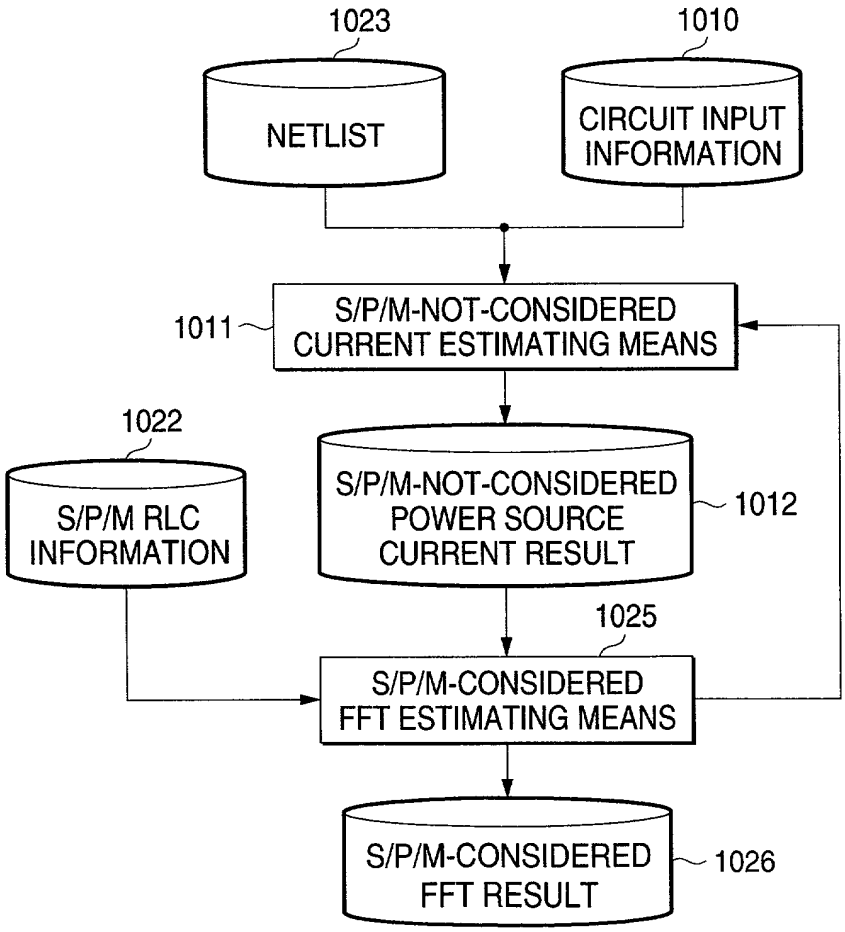

1023
NETLIST
1010
CIRCUIT INPUT INFORMATION
1011
S/P/M-NOT-CONSIDERED CURRENT ESTIMATING MEANS
1022
S/P/M RLC INFORMATION
S/P/M-NOT-CONSIDERED POWER SOURCE CURRENT RESULT
1012
1025
S/P/M-CONSIDERED FFT ESTIMATING MEANS
S/P/M-CONSIDERED FFT RESULT
1026

FIG. 13

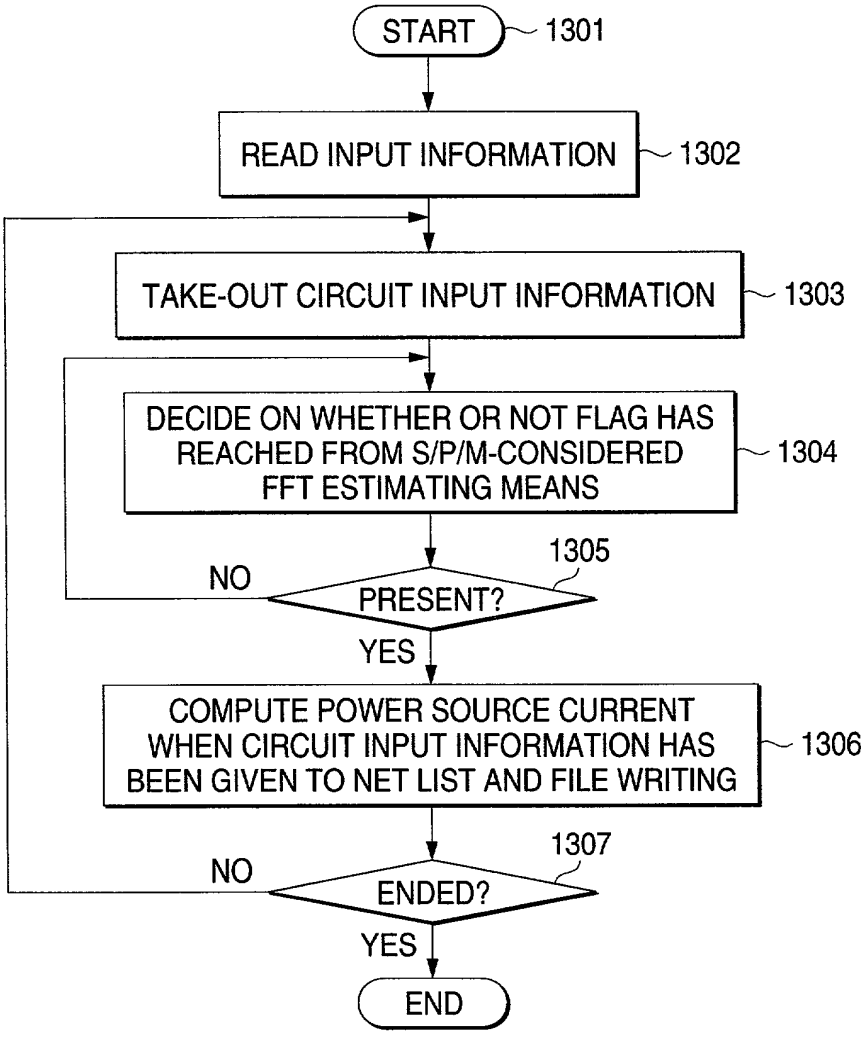

START
1301
READ INPUT INFORMATION
1302
TAKE-OUT CIRCUIT INPUT INFORMATION
1303
DECIDE ON WHETHER OR NOT FLAG HAS REACHED FROM S/P/M-CONSIDERED FFT ESTIMATING MEANS
1304
1305
NO
PRESENT?
YES
COMPUTE POWER SOURCE CURRENT WHEN CIRCUIT INPUT INFORMATION HAS BEEN GIVEN TO NET LIST AND FILE WRITING
1306
1307
NO
ENDED?
YES
END

FIG. 14

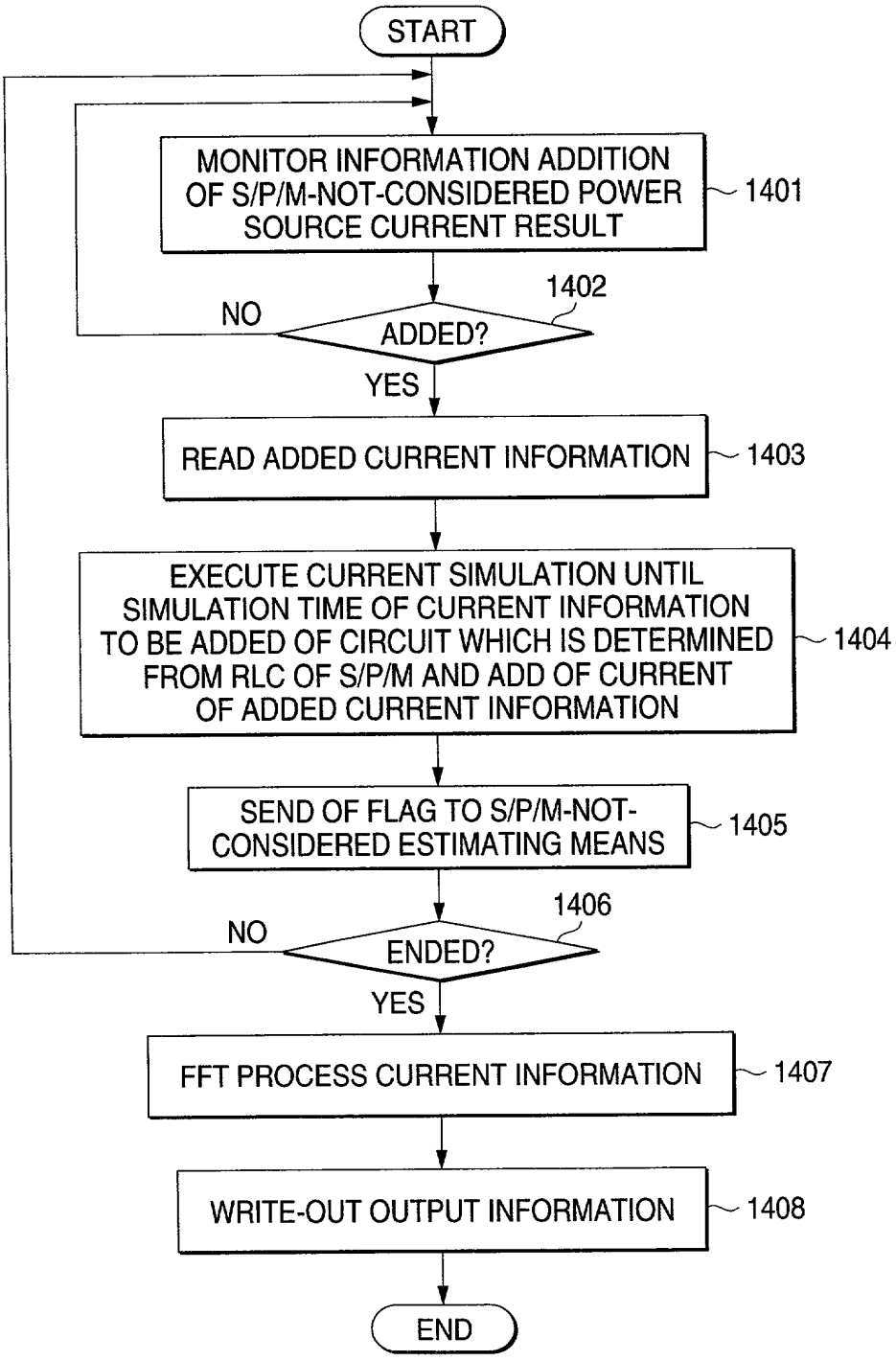

START
MONITOR INFORMATION ADDITION OF S/P/M-NOT-CONSIDERED POWER SOURCE CURRENT RESULT
1401
1402
NO
ADDED?
YES
READ ADDED CURRENT INFORMATION
1403
EXECUTE CURRENT SIMULATION UNTIL SIMULATION TIME OF CURRENT INFORMATION TO BE ADDED OF CIRCUIT WHICH IS DETERMINED FROM RLC OF S/P/M AND ADD OF CURRENT OF ADDED CURRENT INFORMATION
1404
SEND OF FLAG TO S/P/M-NOT-CONSIDERED ESTIMATING MEANS
1405
1406
NO
ENDED?
YES
FFT PROCESS CURRENT INFORMATION
1407
WRITE-OUT OUTPUT INFORMATION
1408
END

FIG. 15

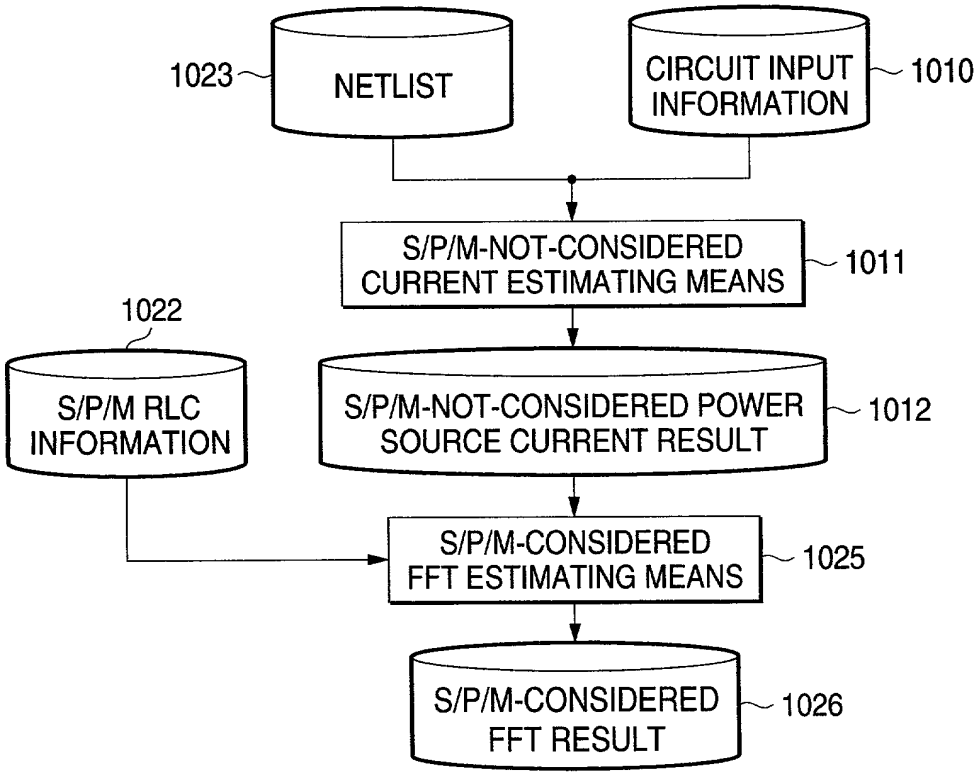

1023
NETLIST
CIRCUIT INPUT INFORMATION
1010
S/P/M-NOT-CONSIDERED CURRENT ESTIMATING MEANS
1011
1022
S/P/M RLC INFORMATION
S/P/M-NOT-CONSIDERED POWER SOURCE CURRENT RESULT
1012
S/P/M-CONSIDERED FFT ESTIMATING MEANS
1025
S/P/M-CONSIDERED FFT RESULT
1026

FIG. 16

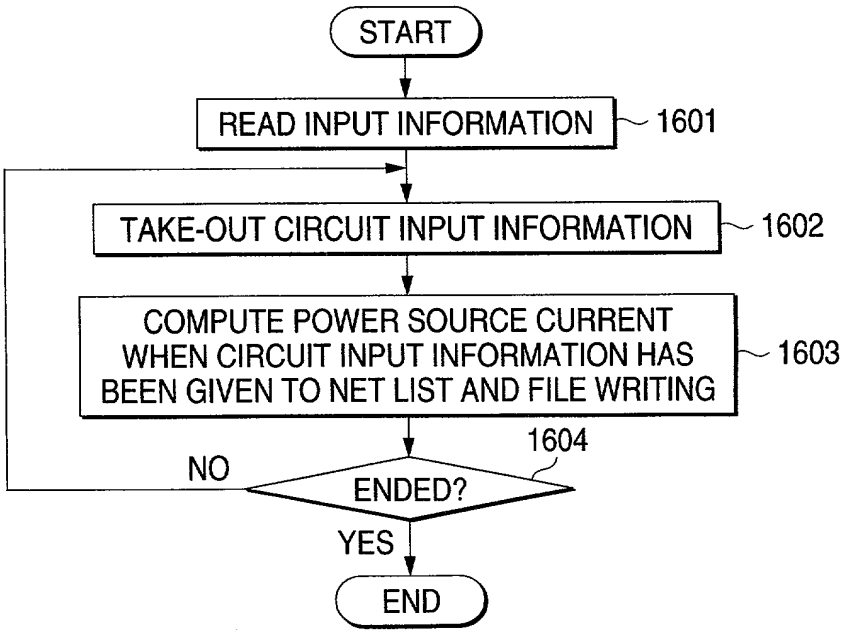

START
READ INPUT INFORMATION
1601
TAKE-OUT CIRCUIT INPUT INFORMATION
1602
COMPUTE POWER SOURCE CURRENT WHEN CIRCUIT INPUT INFORMATION HAS BEEN GIVEN TO NET LIST AND FILE WRITING
1603
1604
NO
ENDED?
YES
END

FIG. 17

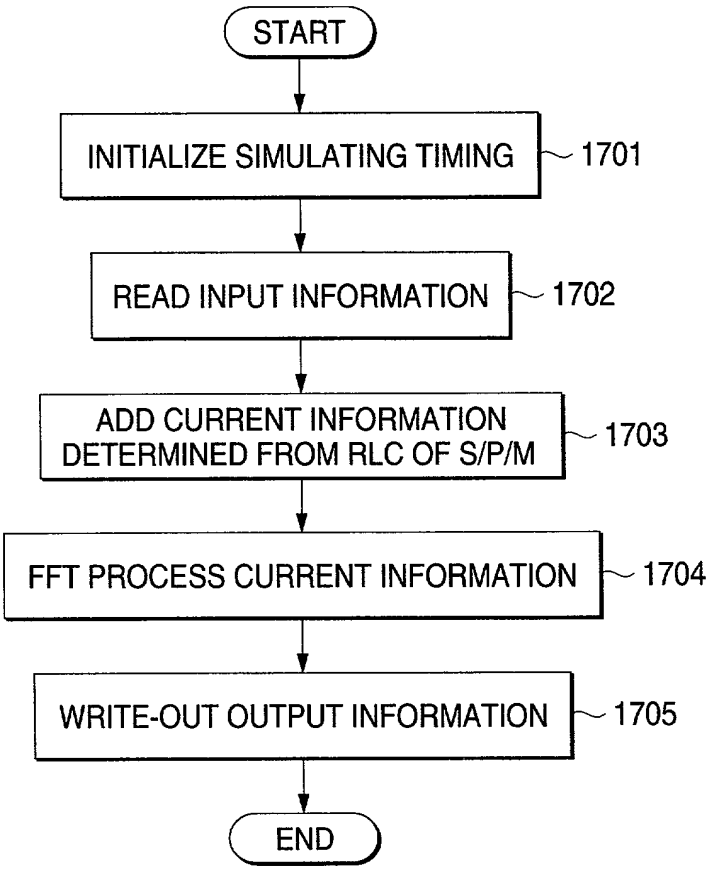

START
INITIALIZE SIMULATING TIMING
1701
READ INPUT INFORMATION
1702
ADD CURRENT INFORMATION DETERMINED FROM RLC OF S/P/M
1703
FFT PROCESS CURRENT INFORMATION
1704
WRITE-OUT OUTPUT INFORMATION
1705
END

FIG. 18

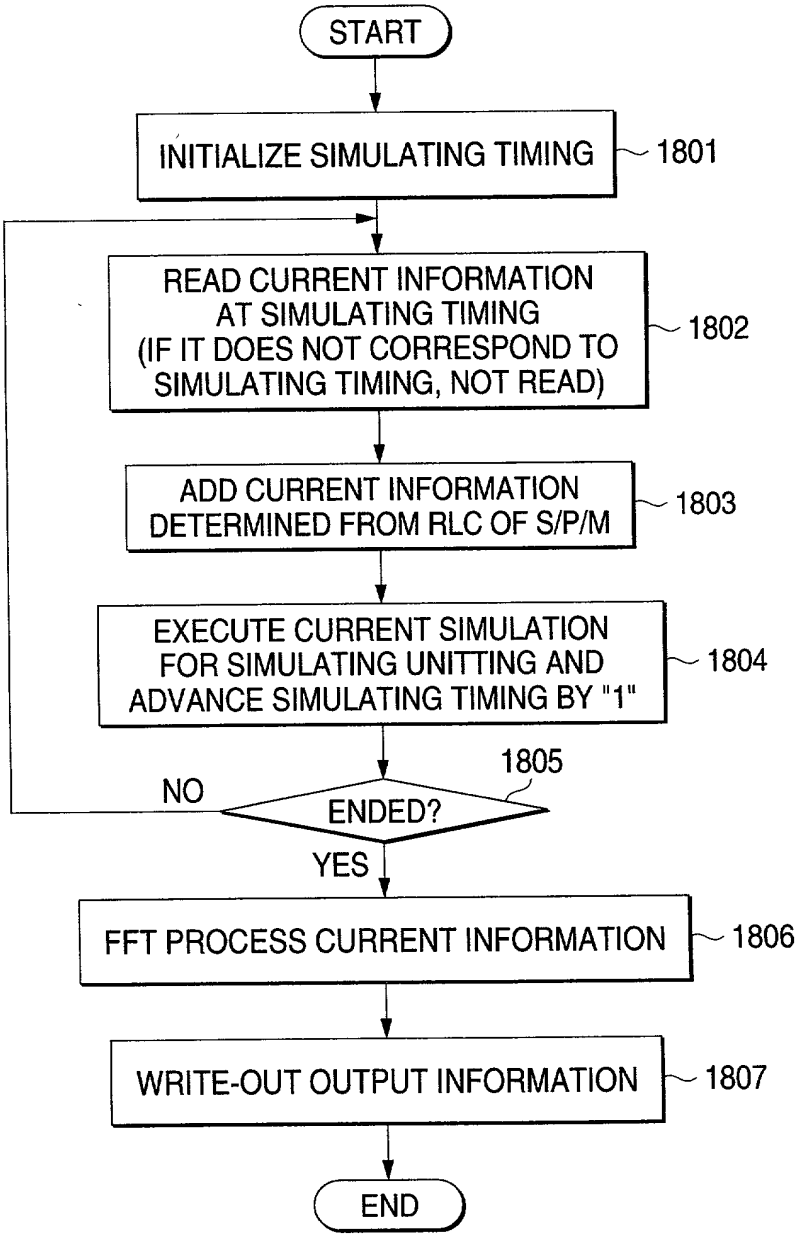

START
INITIALIZE SIMULATING TIMING
1801
READ CURRENT INFORMATION AT SIMULATING TIMING (IF IT DOES NOT CORRESPOND TO SIMULATING TIMING, NOT READ)
1802
ADD CURRENT INFORMATION DETERMINED FROM RLC OF S/P/M
1803
EXECUTE CURRENT SIMULATION FOR SIMULATING UNITTING AND ADVANCE SIMULATING TIMING BY "1"
1804
1805
NO
ENDED?
YES
FFT PROCESS CURRENT INFORMATION
1806
WRITE-OUT OUTPUT INFORMATION
1807
END

FIG. 19

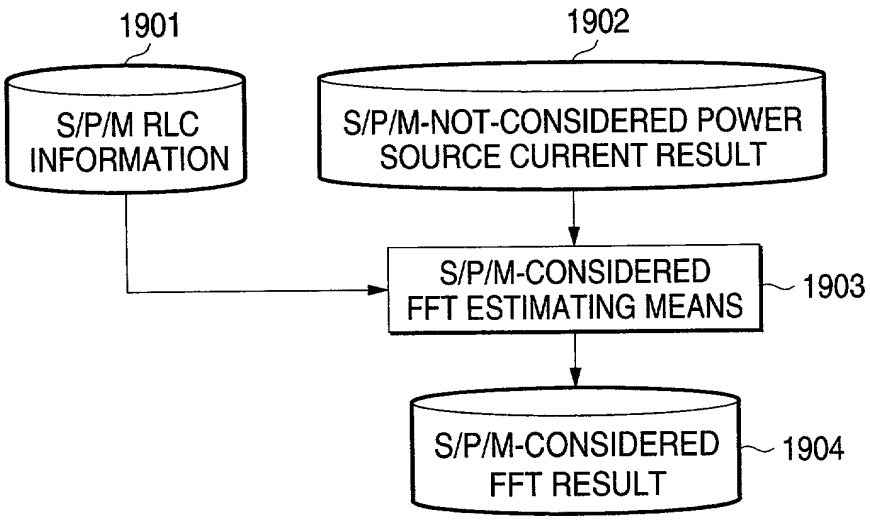

1901
1902
S/P/M RLC INFORMATION
S/P/M-NOT-CONSIDERED POWER SOURCE CURRENT RESULT
S/P/M-CONSIDERED FFT ESTIMATING MEANS
1903
S/P/M-CONSIDERED FFT RESULT
1904

FIG. 20

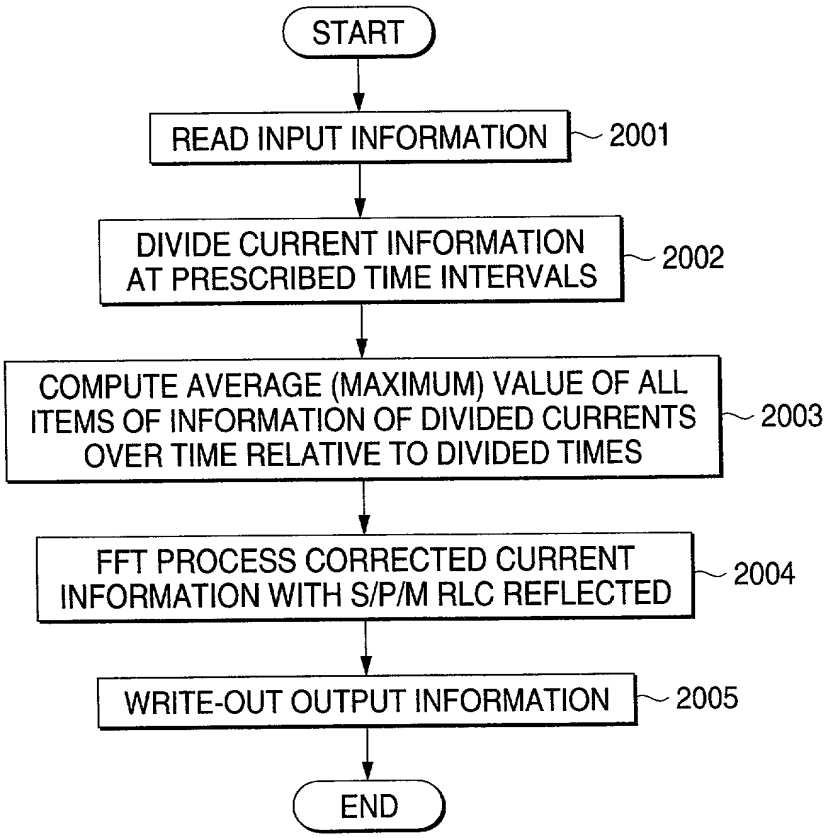

START
READ INPUT INFORMATION
2001
DIVIDE CURRENT INFORMATION AT PRESCRIBED TIME INTERVALS
2002
COMPUTE AVERAGE (MAXIMUM) VALUE OF ALL ITEMS OF INFORMATION OF DIVIDED CURRENTS OVER TIME RELATIVE TO DIVIDED TIMES
2003
FFT PROCESS CORRECTED CURRENT INFORMATION WITH S/P/M RLC REFLECTED
2004
WRITE-OUT OUTPUT INFORMATION
2005
END

FIG. 21

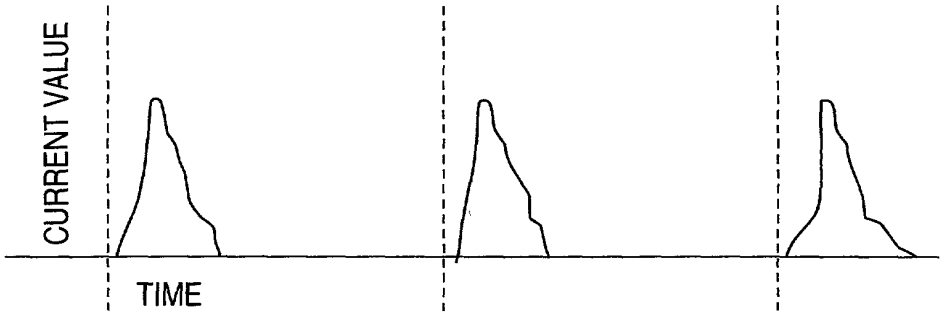


FIG. 22

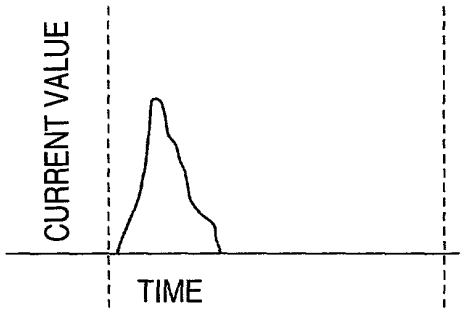


FIG. 23

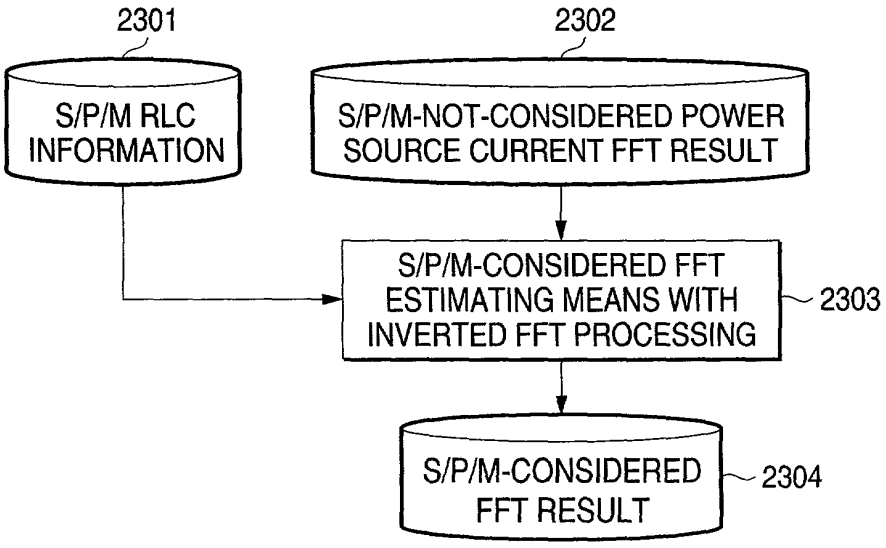


FIG. 24

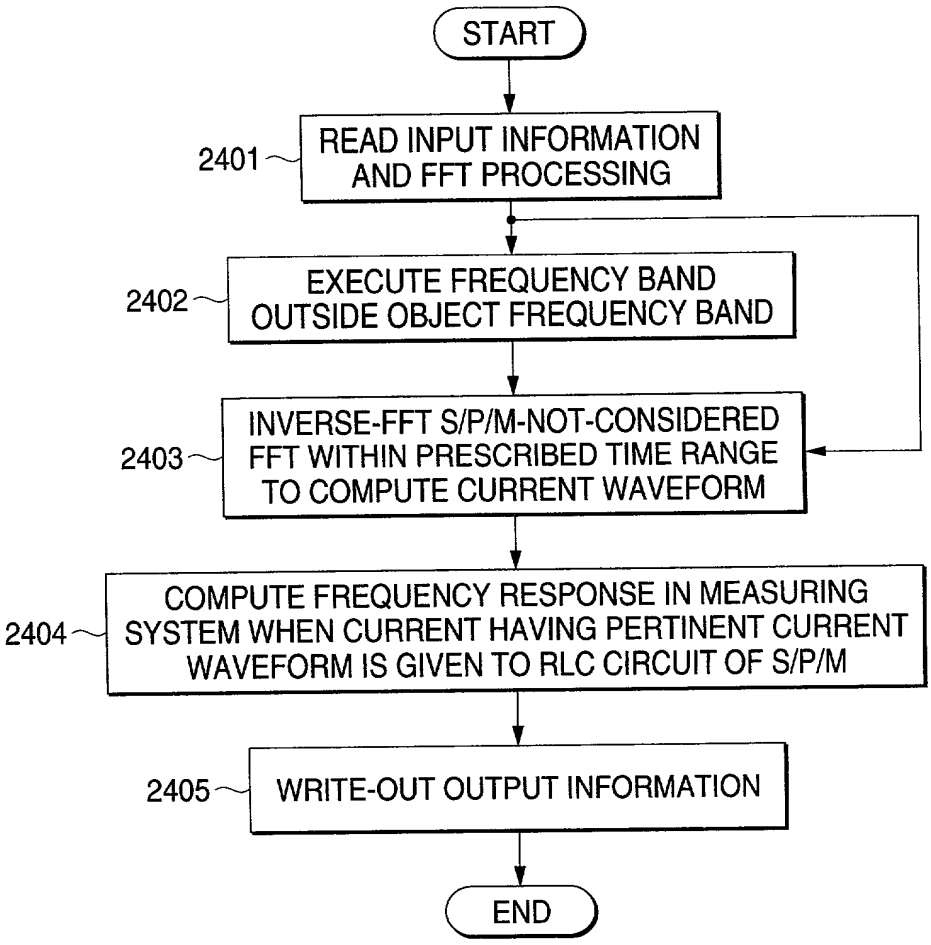

START
2401
READ INPUT INFORMATION AND FFT PROCESSING
2402
EXECUTE FREQUENCY BAND OUTSIDE OBJECT FREQUENCY BAND
2403
INVERSE-FFT S/P/M-NOT-CONSIDERED FFT WITHIN PRESCRIBED TIME RANGE TO COMPUTE CURRENT WAVEFORM
2404
COMPUTE FREQUENCY RESPONSE IN MEASURING SYSTEM WHEN CURRENT HAVING PERTINENT CURRENT WAVEFORM IS GIVEN TO RLC CIRCUIT OF S/P/M
2405
WRITE-OUT OUTPUT INFORMATION
END

FIG. 25

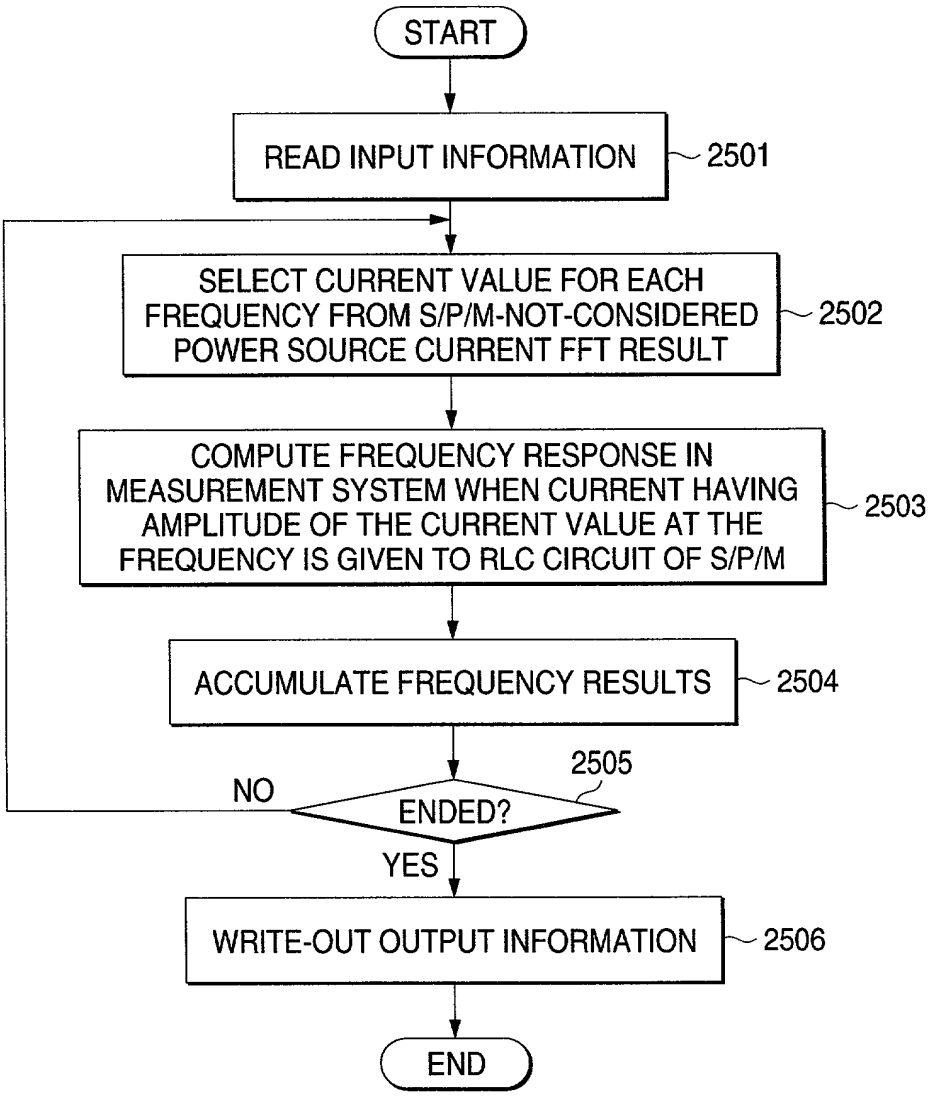

START
READ INPUT INFORMATION
2501
SELECT CURRENT VALUE FOR EACH FREQUENCY FROM S/P/M-NOT-CONSIDERED POWER SOURCE CURRENT FFT RESULT
2502
COMPUTE FREQUENCY RESPONSE IN MEASUREMENT SYSTEM WHEN CURRENT HAVING AMPLITUDE OF THE CURRENT VALUE AT THE FREQUENCY IS GIVEN TO RLC CIRCUIT OF S/P/M
2503
ACCUMULATE FREQUENCY RESULTS
2504
2505
NO
ENDED?
YES
WRITE-OUT OUTPUT INFORMATION
2506
END

FIG. 26

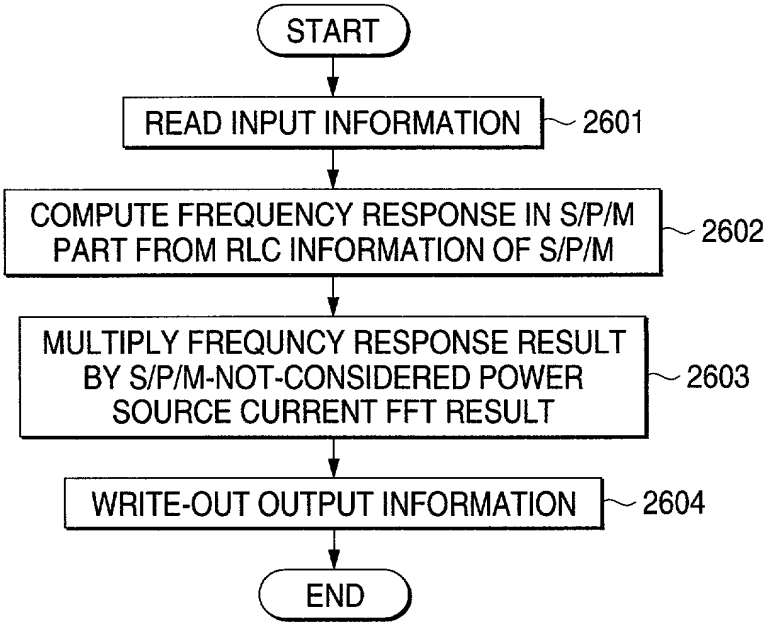

START
READ INPUT INFORMATION
2601
COMPUTE FREQUENCY RESPONSE IN S/P/M PART FROM RLC INFORMATION OF S/P/M
2602
MULTIPLY FREQUNCY RESPONSE RESULT BY S/P/M-NOT-CONSIDERED POWER SOURCE CURRENT FFT RESULT
2603
WRITE-OUT OUTPUT INFORMATION
2604
END

FIG. 27

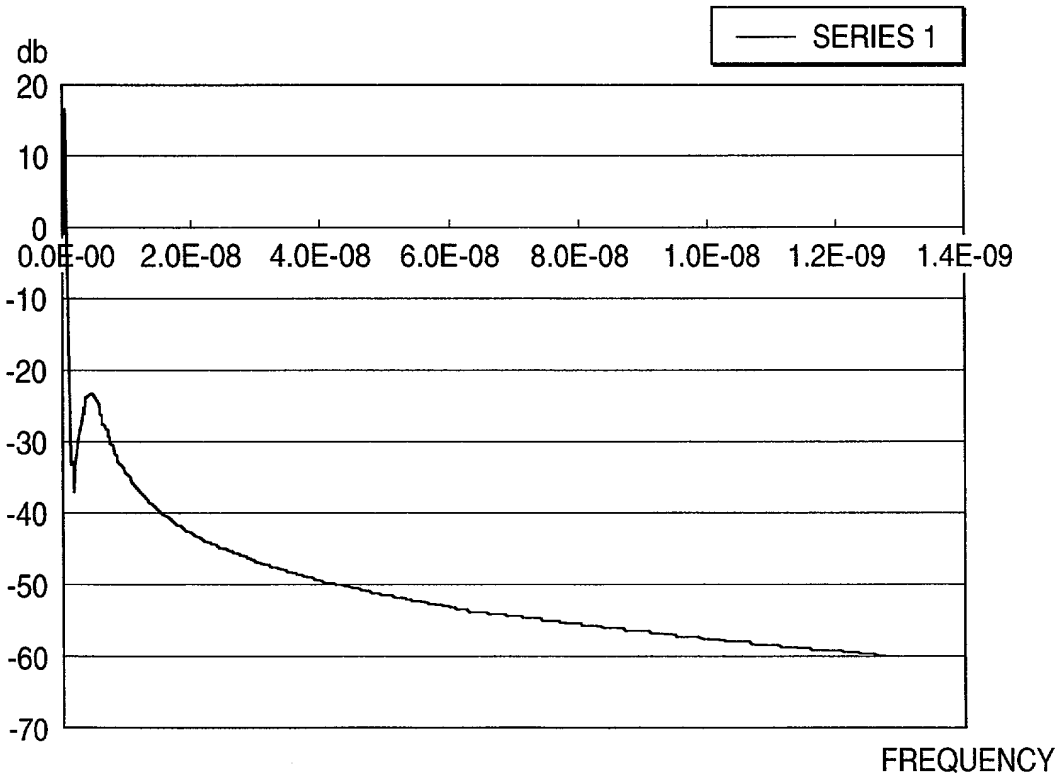

SERIES 1
db
20
10
0
0.0E-00
2.0E-08
4.0E-08
6.0E-08
8.0E-08
1.0E-08
1.2E-09
1.4E-09
-10
-20
-30
-40
-50
-60
-70
FREQUENCY

FIG. 28

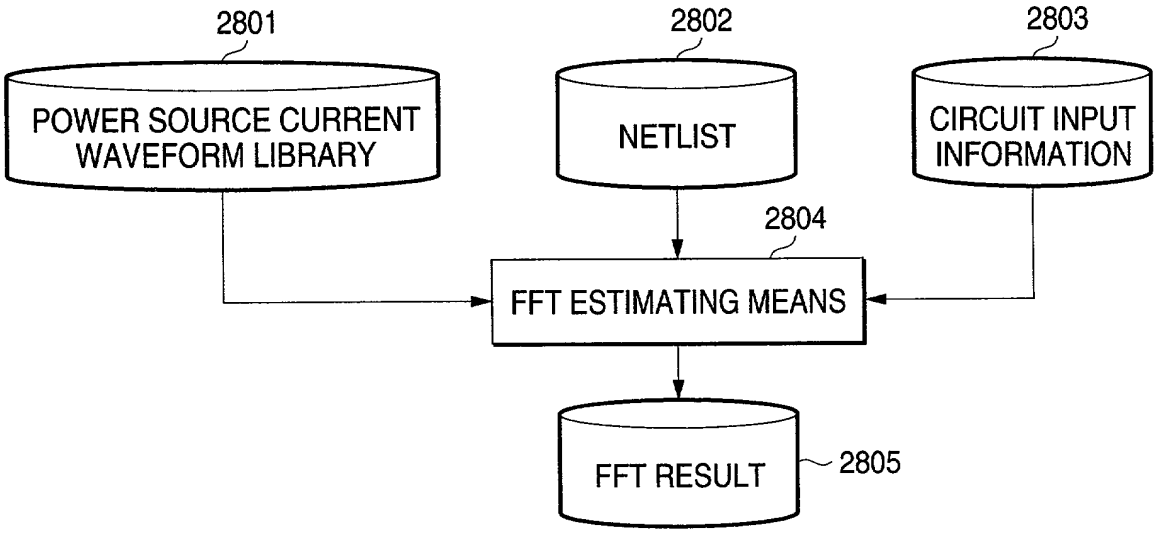

2801
2802
2803
POWER SOURCE CURRENT WAVEFORM LIBRARY
NETLIST
CIRCUIT INPUT INFORMATION
2804
FFT ESTIMATING MEANS
FFT RESULT
2805

FIG. 29

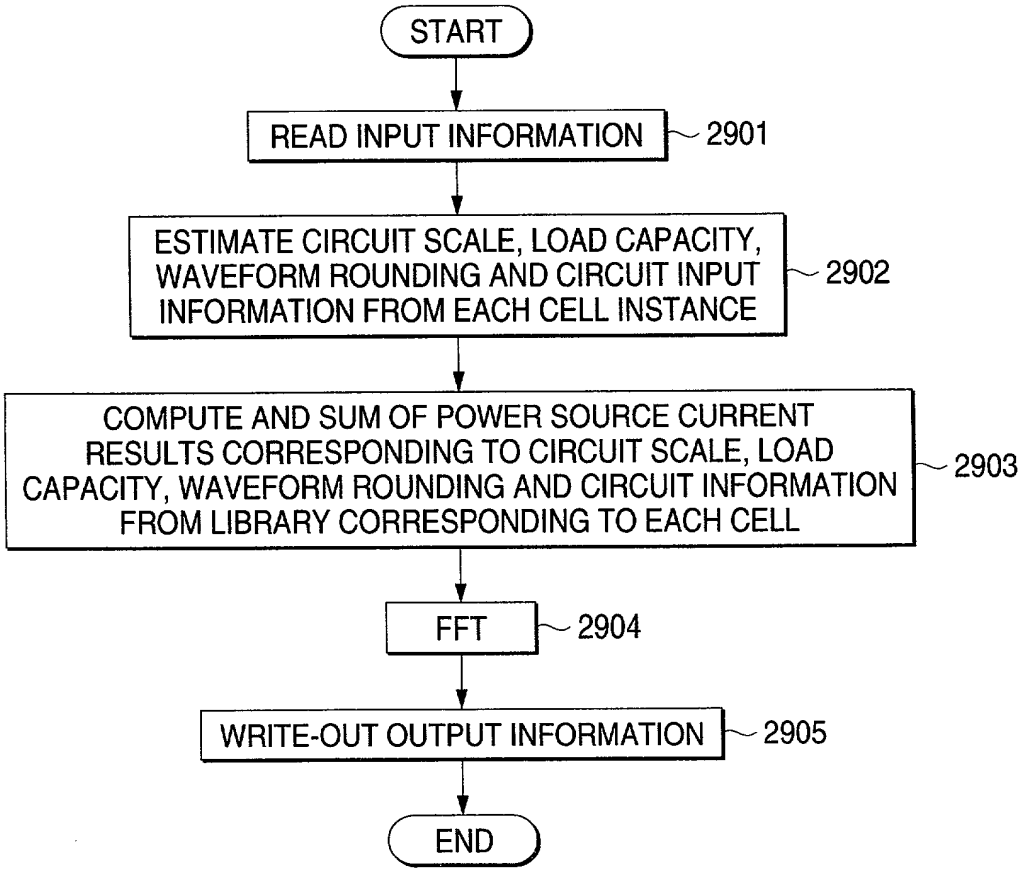

START
READ INPUT INFORMATION
2901
ESTIMATE CIRCUIT SCALE, LOAD CAPACITY, WAVEFORM ROUNDING AND CIRCUIT INPUT INFORMATION FROM EACH CELL INSTANCE
2902
COMPUTE AND SUM OF POWER SOURCE CURRENT RESULTS CORRESPONDING TO CIRCUIT SCALE, LOAD CAPACITY, WAVEFORM ROUNDING AND CIRCUIT INFORMATION FROM LIBRARY CORRESPONDING TO EACH CELL
2903
FFT
2904
WRITE-OUT OUTPUT INFORMATION
2905
END

FIG. 30

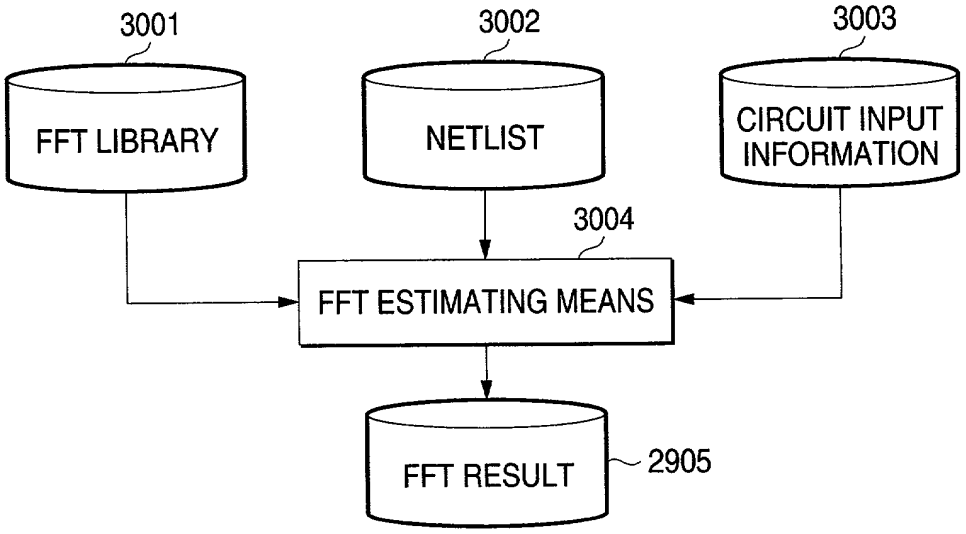

3001
3002
3003
FFT LIBRARY
NETLIST
CIRCUIT INPUT INFORMATION
3004
FFT ESTIMATING MEANS
FFT RESULT
2905

FIG. 31

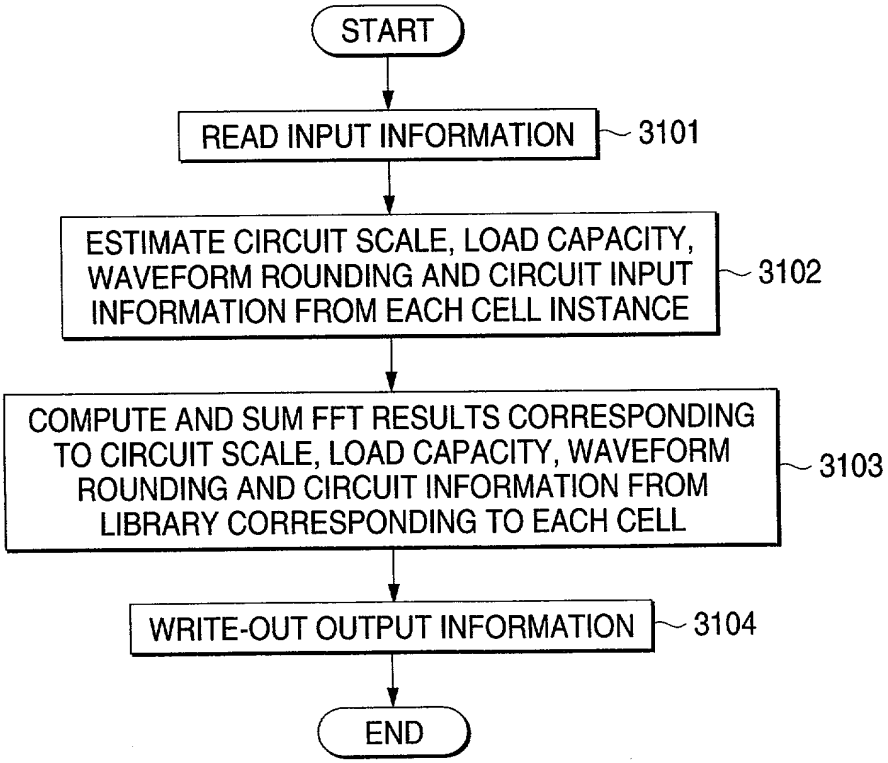

START
READ INPUT INFORMATION
3101
ESTIMATE CIRCUIT SCALE, LOAD CAPACITY, WAVEFORM ROUNDING AND CIRCUIT INPUT INFORMATION FROM EACH CELL INSTANCE
3102
COMPUTE AND SUM FFT RESULTS CORRESPONDING TO CIRCUIT SCALE, LOAD CAPACITY, WAVEFORM ROUNDING AND CIRCUIT INFORMATION FROM LIBRARY CORRESPONDING TO EACH CELL
3103
WRITE-OUT OUTPUT INFORMATION
3104
END

FIG. 32

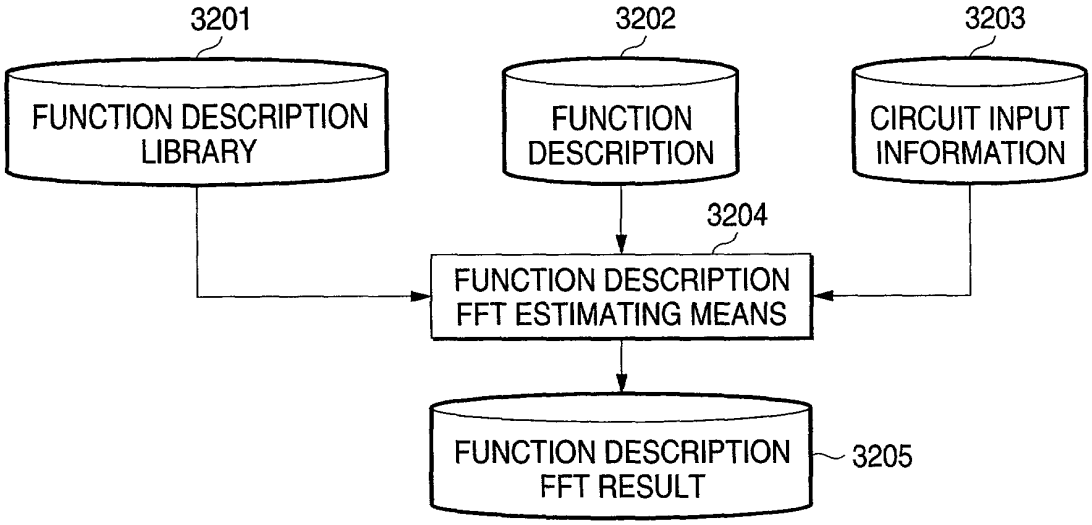

3201
3202
3203
FUNCTION DESCRIPTION LIBRARY
FUNCTION DESCRIPTION
CIRCUIT INPUT INFORMATION
3204
FUNCTION DESCRIPTION FFT ESTIMATING MEANS
FUNCTION DESCRIPTION FFT RESULT
3205

FIG. 33

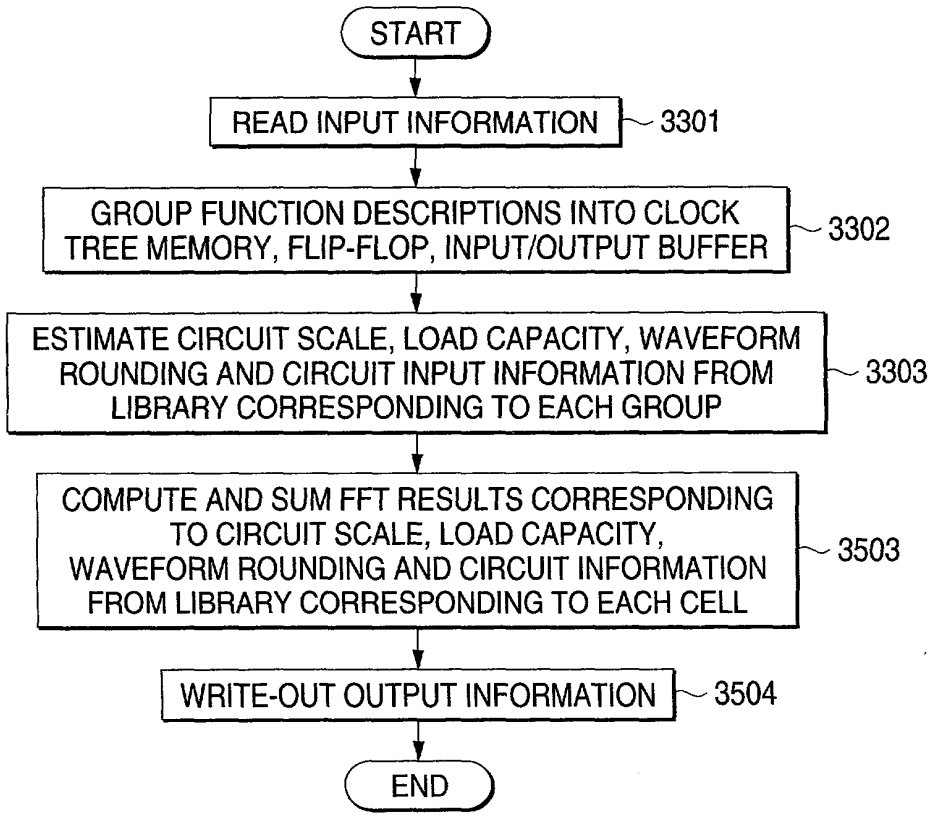

START
READ INPUT INFORMATION
3301
GROUP FUNCTION DESCRIPTIONS INTO CLOCK TREE MEMORY, FLIP-FLOP, INPUT/OUTPUT BUFFER
3302
ESTIMATE CIRCUIT SCALE, LOAD CAPACITY, WAVEFORM ROUNDING AND CIRCUIT INPUT INFORMATION FROM LIBRARY CORRESPONDING TO EACH GROUP
3303
COMPUTE AND SUM FFT RESULTS CORRESPONDING TO CIRCUIT SCALE, LOAD CAPACITY, WAVEFORM ROUNDING AND CIRCUIT INFORMATION FROM LIBRARY CORRESPONDING TO EACH CELL
3503
WRITE-OUT OUTPUT INFORMATION
3504
END

FIG. 34

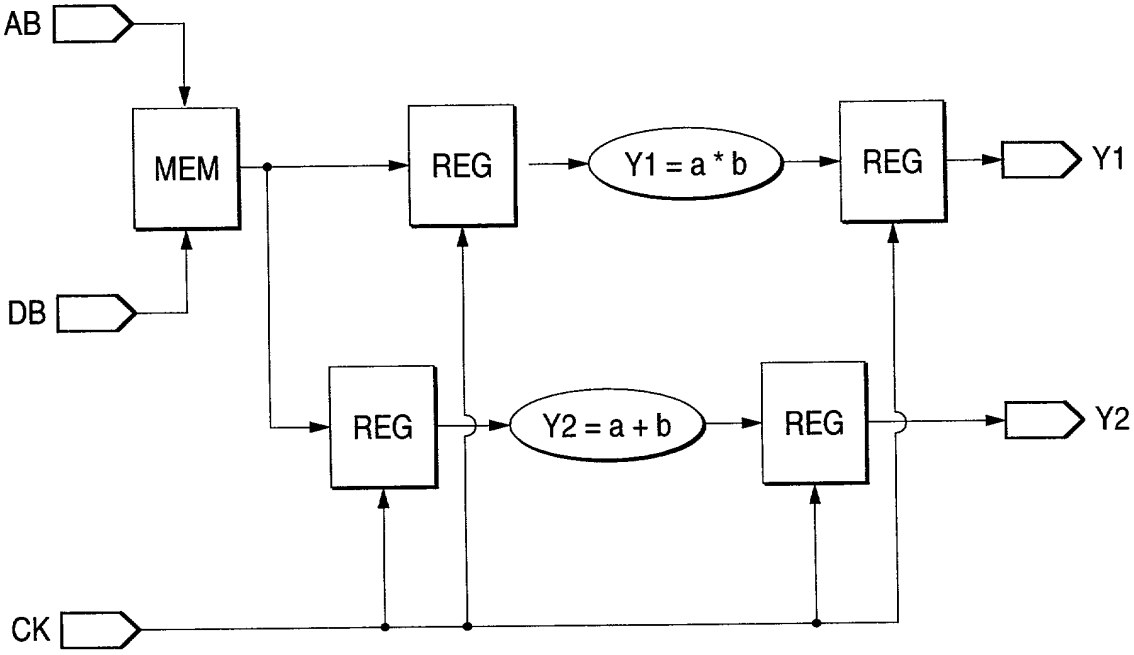

AB
MEM
REG
Y1 = a * b
REG
Y1
DB
REG
Y2 = a + b
REG
Y2
CK

FIG. 35

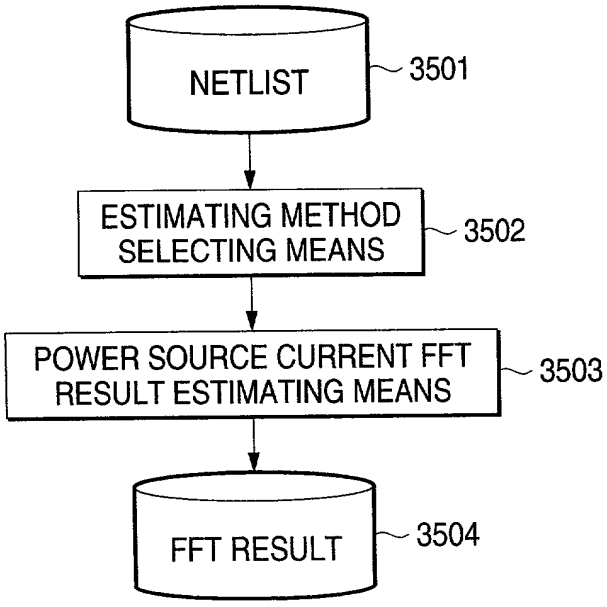

NETLIST
3501
ESTIMATING METHOD SELECTING MEANS
3502
POWER SOURCE CURRENT FFT RESULT ESTIMATING MEANS
3503
FFT RESULT
3504

FIG. 36

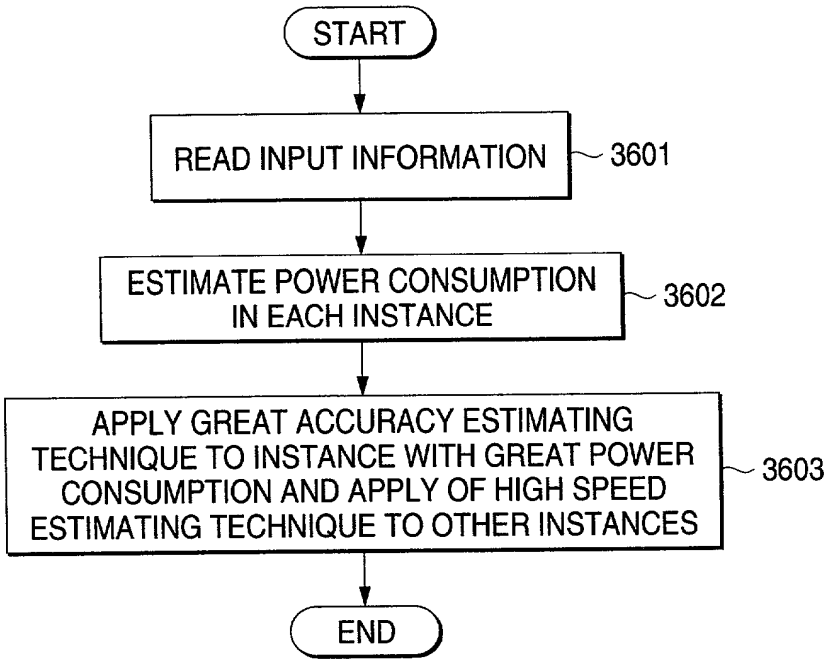

START
READ INPUT INFORMATION
3601
ESTIMATE POWER CONSUMPTION IN EACH INSTANCE
3602
APPLY GREAT ACCURACY ESTIMATING TECHNIQUE TO INSTANCE WITH GREAT POWER CONSUMPTION AND APPLY OF HIGH SPEED ESTIMATING TECHNIQUE TO OTHER INSTANCES
3603
END

FIG. 37

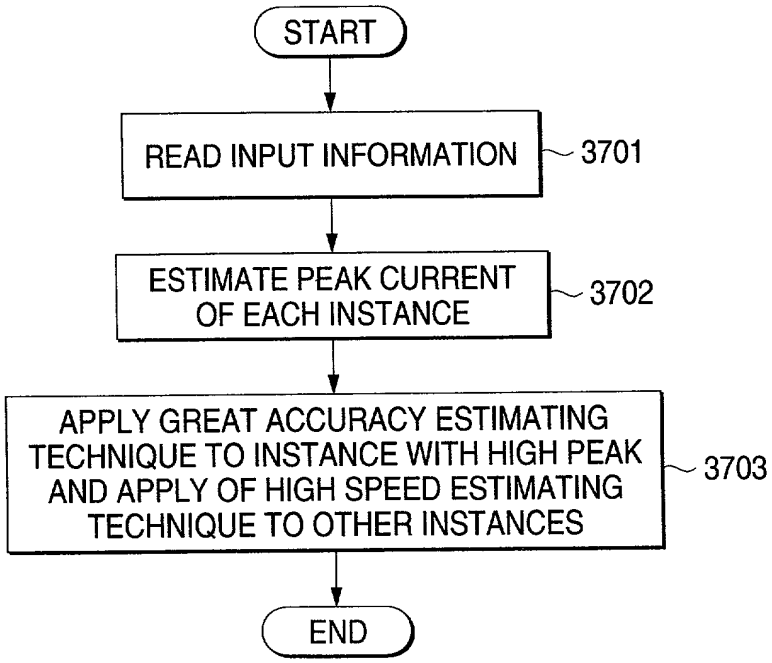

START
READ INPUT INFORMATION
3701
ESTIMATE PEAK CURRENT OF EACH INSTANCE
3702
APPLY GREAT ACCURACY ESTIMATING TECHNIQUE TO INSTANCE WITH HIGH PEAK AND APPLY OF HIGH SPEED ESTIMATING TECHNIQUE TO OTHER INSTANCES
3703
END

FIG. 38

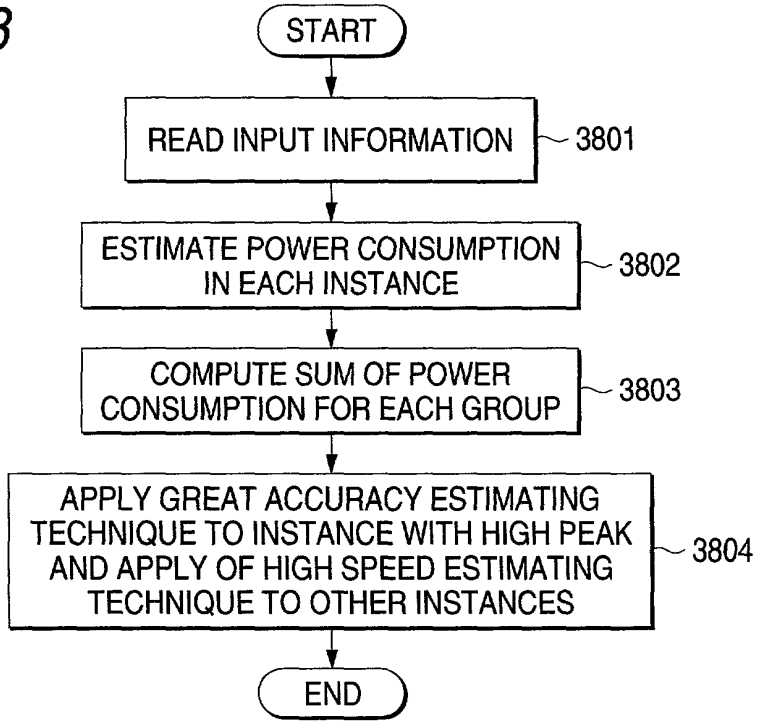

START
READ INPUT INFORMATION
3801
ESTIMATE POWER CONSUMPTION IN EACH INSTANCE
3802
COMPUTE SUM OF POWER CONSUMPTION FOR EACH GROUP
3803
APPLY GREAT ACCURACY ESTIMATING TECHNIQUE TO INSTANCE WITH HIGH PEAK AND APPLY OF HIGH SPEED ESTIMATING TECHNIQUE TO OTHER INSTANCES
3804
END

FIG. 39

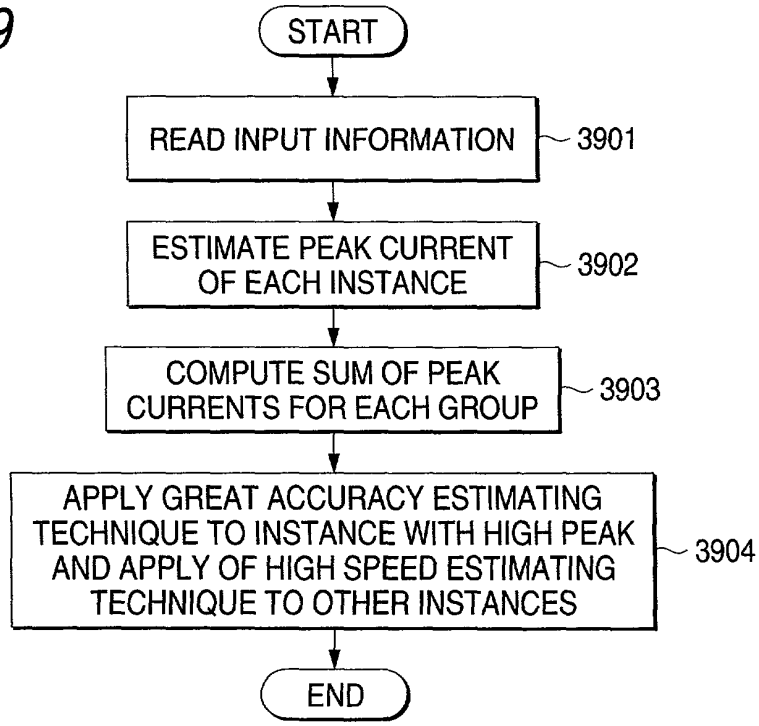

START
READ INPUT INFORMATION
3901
ESTIMATE PEAK CURRENT OF EACH INSTANCE
3902
COMPUTE SUM OF PEAK CURRENTS FOR EACH GROUP
3903
APPLY GREAT ACCURACY ESTIMATING TECHNIQUE TO INSTANCE WITH HIGH PEAK AND APPLY OF HIGH SPEED ESTIMATING TECHNIQUE TO OTHER INSTANCES
3904
END

FIG. 40

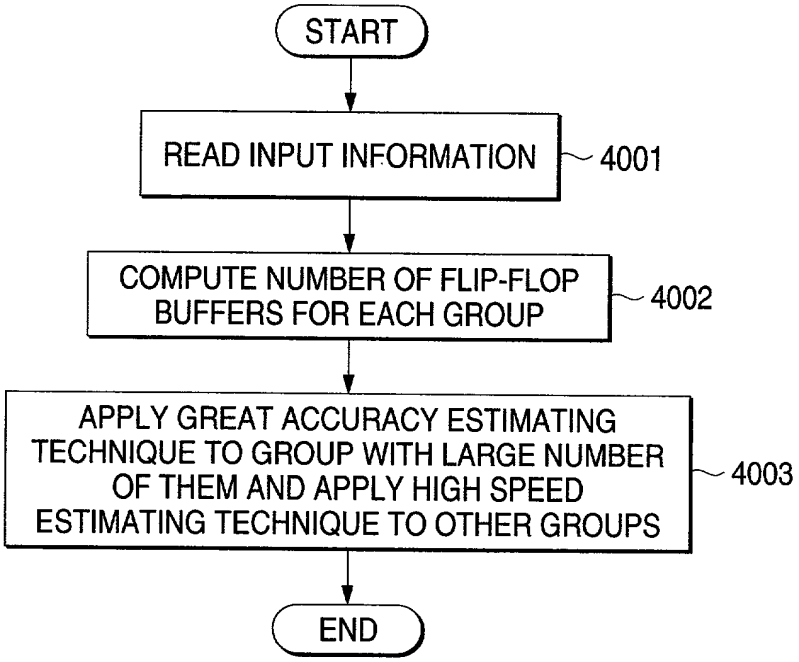

START
READ INPUT INFORMATION
4001
COMPUTE NUMBER OF FLIP-FLOP BUFFERS FOR EACH GROUP
4002
APPLY GREAT ACCURACY ESTIMATING TECHNIQUE TO GROUP WITH LARGE NUMBER OF THEM AND APPLY HIGH SPEED ESTIMATING TECHNIQUE TO OTHER GROUPS
4003
END

FIG. 41

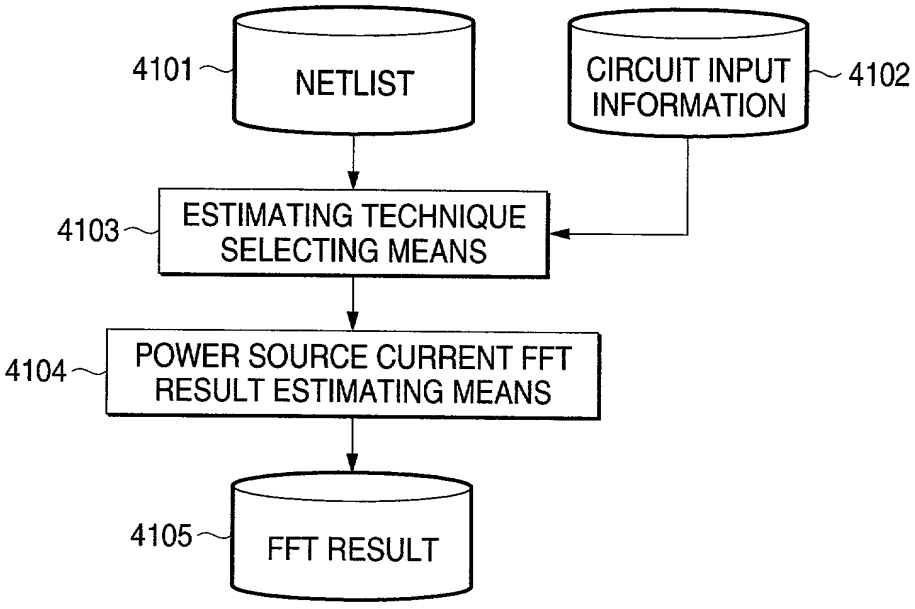

4101
NETLIST
CIRCUIT INPUT INFORMATION
4102
4103
ESTIMATING TECHNIQUE SELECTING MEANS
4104
POWER SOURCE CURRENT FFT RESULT ESTIMATING MEANS
4105
FFT RESULT

FIG. 42

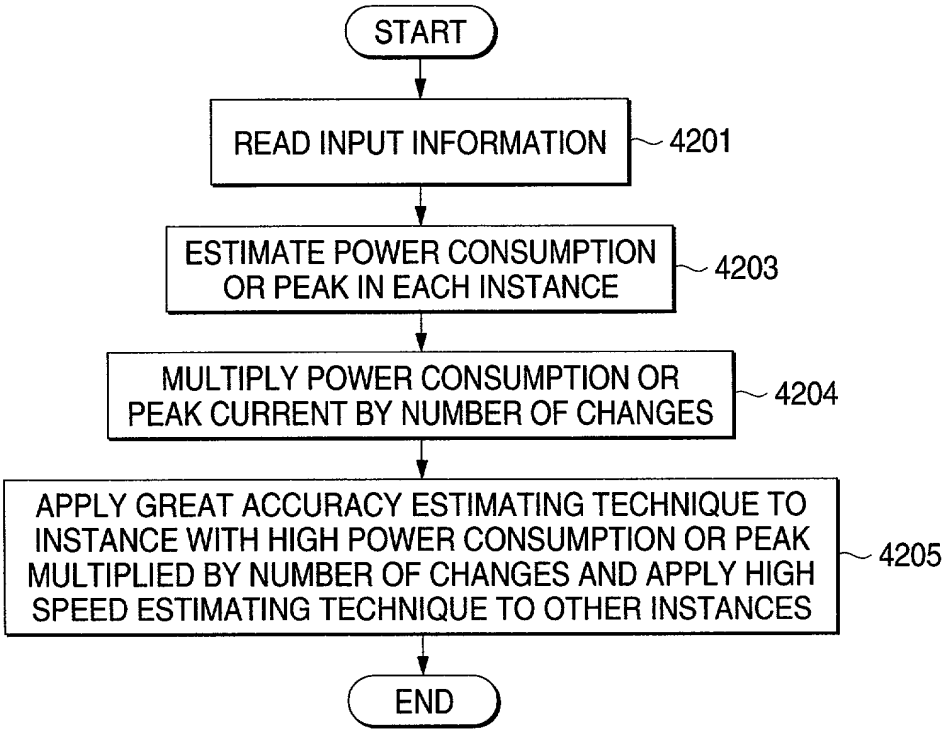

START
READ INPUT INFORMATION
4201
ESTIMATE POWER CONSUMPTION OR PEAK IN EACH INSTANCE
4203
MULTIPLY POWER CONSUMPTION OR PEAK CURRENT BY NUMBER OF CHANGES
4204
APPLY GREAT ACCURACY ESTIMATING TECHNIQUE TO INSTANCE WITH HIGH POWER CONSUMPTION OR PEAK MULTIPLIED BY NUMBER OF CHANGES AND APPLY HIGH SPEED ESTIMATING TECHNIQUE TO OTHER INSTANCES
4205
END

FIG. 43

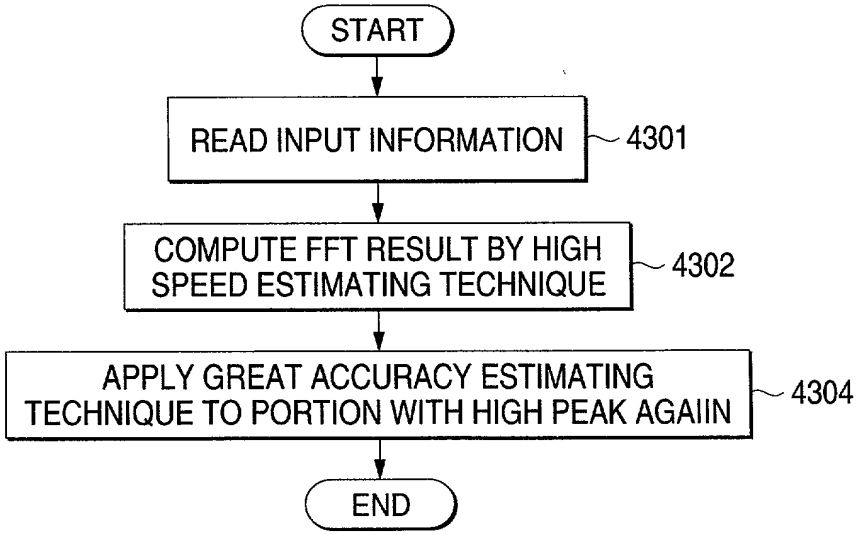

START
READ INPUT INFORMATION
4301
COMPUTE FFT RESULT BY HIGH SPEED ESTIMATING TECHNIQUE
4302
APPLY GREAT ACCURACY ESTIMATING TECHNIQUE TO PORTION WITH HIGH PEAK AGAIIN
4304
END

FIG. 44

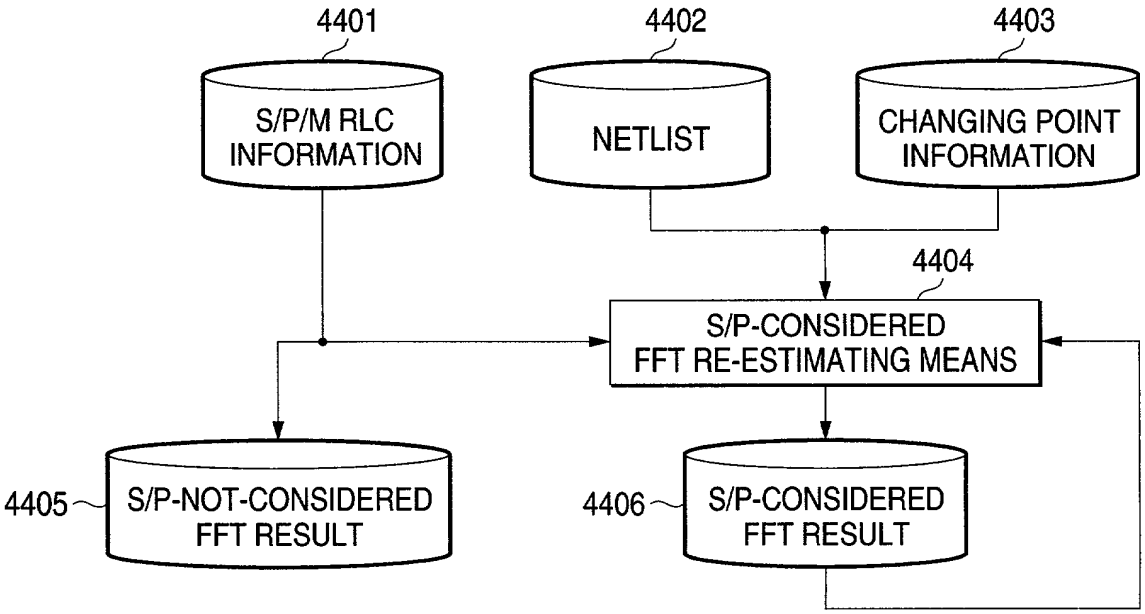

4401
S/P/M RLC INFORMATION
4402
NETLIST
4403
CHANGING POINT INFORMATION
4404
S/P-CONSIDERED FFT RE-ESTIMATING MEANS
4405
S/P-NOT-CONSIDERED FFT RESULT
4406
S/P-CONSIDERED FFT RESULT

FIG. 45

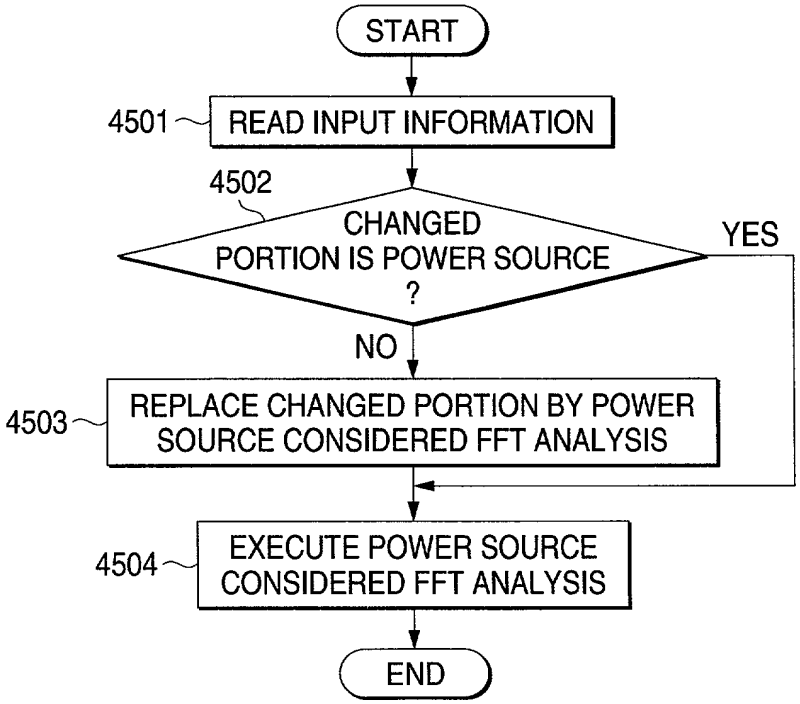

START
4501
READ INPUT INFORMATION
4502
CHANGED PORTION IS POWER SOURCE ?
YES
NO
4503
REPLACE CHANGED PORTION BY POWER SOURCE CONSIDERED FFT ANALYSIS
4504
EXECUTE POWER SOURCE CONSIDERED FFT ANALYSIS
END

FIG. 46

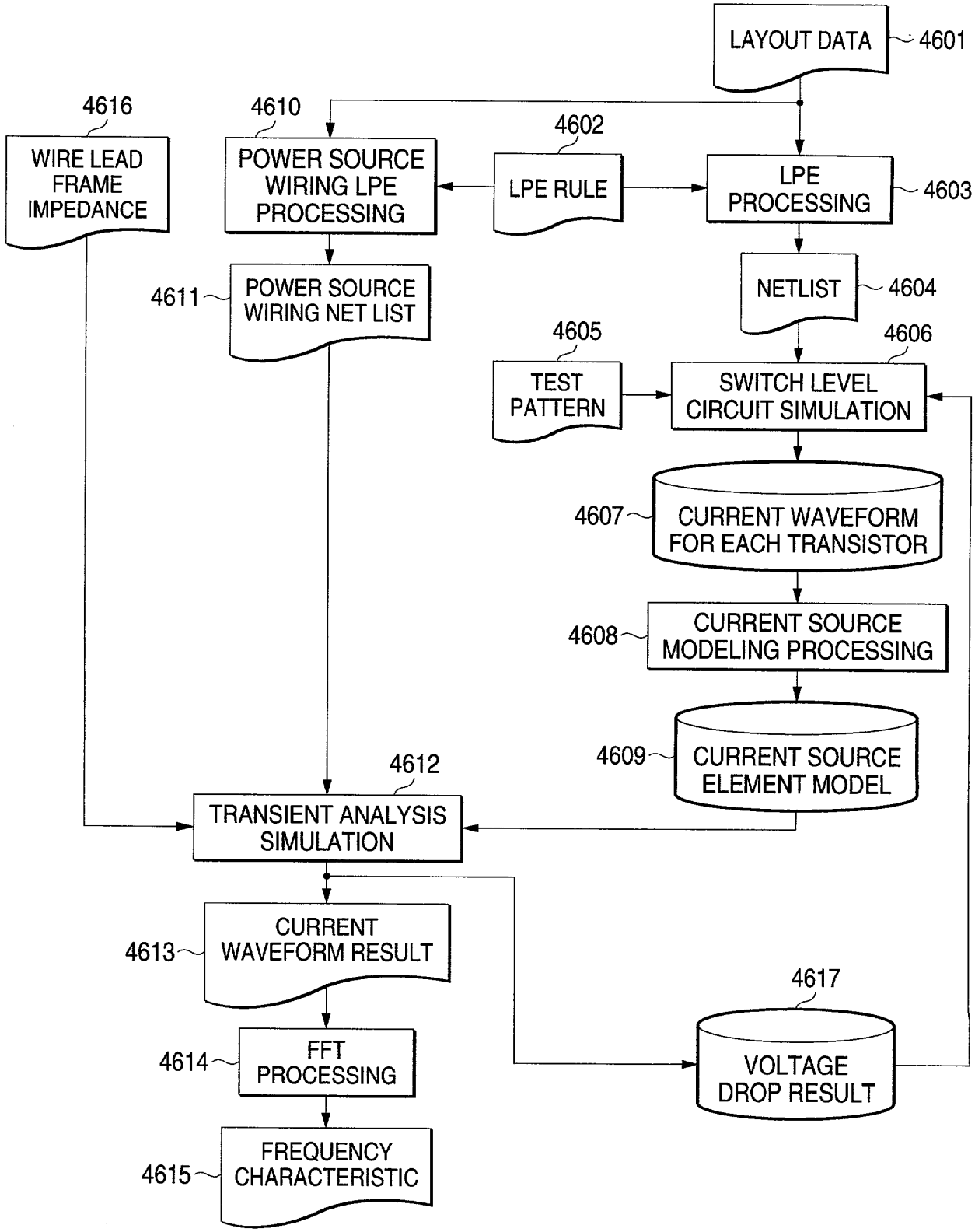
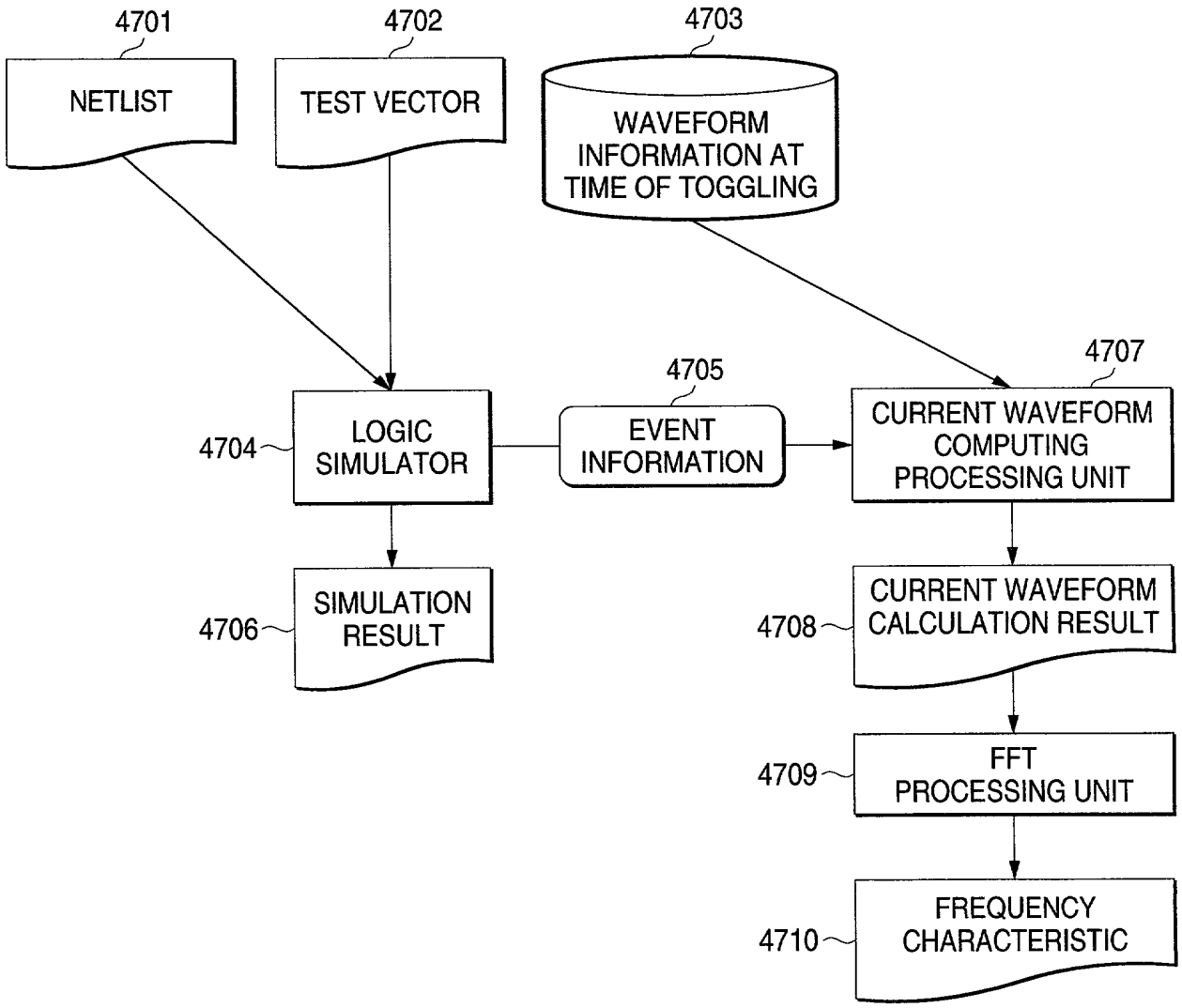

LAYOUT DATA
4601
4616
WIRE LEAD FRAME IMPEDANCE
4610
POWER SOURCE WIRING LPE PROCESSING
4602
LPE RULE
LPE PROCESSING
4603
4611
POWER SOURCE WIRING NET LIST
NETLIST
4604
4605
TEST PATTERN
4606
SWITCH LEVEL CIRCUIT SIMULATION
4607
CURRENT WAVEFORM FOR EACH TRANSISTOR
4608
CURRENT SOURCE MODELING PROCESSING
4609
CURRENT SOURCE ELEMENT MODEL
4612
TRANSIENT ANALYSIS SIMULATION
4613
CURRENT WAVEFORM RESULT
4617
4614
FFT PROCESSING
VOLTAGE DROP RESULT
4615
FREQUENCY CHARACTERISTIC

FIG. 47


4701
NETLIST
4702
TEST VECTOR
4703
WAVEFORM INFORMATION AT TIME OF TOGGLING
4704
LOGIC SIMULATOR
4705
EVENT INFORMATION
4707
CURRENT WAVEFORM COMPUTING PROCESSING UNIT
4706
SIMULATION RESULT
4708
CURRENT WAVEFORM CALCULATION RESULT
4709
FFT PROCESSING UNIT
4710
FREQUENCY CHARACTERISTIC